

AGENCY USE ONLY

PERMIT NO.: MTG 010 236	Date Rec'd.: 7.10.17	Amount Rec'd.: 0	Check No.: 8	Rec'd By: 8
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Montana Department of
ENVIRONMENTAL QUALITY

WATER PROTECTION BUREAU

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JUL 10 2017

DEQ WATER QUALITY DIVISION

FORM
NOI

Notice of Intent (NOI) for Montana Pollution Discharge Elimination System Application for New and Existing Concentrated Animal Feeding Operations

The Application form is to be completed by the owner or operator of a Concentrated Animal Feeding Operation (CAFO) or Aquatic Animal Production Facility. Please read the attached instructions before completing this form. You must print or type legibly; forms that are not legible or are not complete will be returned. You must maintain a copy of the completed application form for your records.

Section A - Application Status (Check one):

- ☐ New No prior application submitted for this site.
- ☐ Resubmitted Permit Number: MTG _____
- ☒ Renewal Permit Number: MTG 0 1 0 2 3 6
- ☐ Modification Permit Number: MTG _____

ENTERED

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Section B - Facility or Site Information (See instruction sheet.):

Site Name L&M Livestock, LLC Feedlot

Site Location Kinsey, MT @ 16 Mile Marker on Kinsey Rd

Nearest City or Town Miles City County Custer

Latitude 43 34.22 N Longitude 105 41.58 W

Date Facility began operation? 10/2002

Is this facility or site located on Indian Lands? ☐ Yes ☒ No

Section C - Applicant (Owner/Operator) Information:

Owner or Operator Name Loren Hinebauch

Mailing Address 2003 Main St

City, State, and Zip Code Miles City, MT 59301

Phone Number 406-951-0101

Is the person listed above the owner? ☒ Yes ☐ No

Status of Applicant (Check one) ☐ Federal ☐ State ☒ Private ☐ Public ☐ Other (specify) _____

COPY

Section D - Existing or Pending Permits, Certifications, or Approvals: ☒ None

☐ MPDES _____ ☐ RCRA _____
☐ PSD (Air Emissions) _____ ☐ Other _____
☐ 404 Permit (dredge & fill) _____ ☐ Other _____

Section E - Standard Industrial Classification (SIC) Codes:

Provide at least one SIC code which best reflects the activity of project described in Section H.			
Code	A. Primary	Code	B. Second
1	211	2	
Code	C. Third	Code	D. Fourth
3		3	

Section F - Facility or Site Contact Person/Position:

Name and Title, or Position Title Loren Hinebauch
Mailing Address 2003 Main St
City, State, and Zip Code Miles City, MT 59301
Phone Number 406-951-0101

Section G - Receiving Surface Waters(s):

Outfall/Discharge Locations: For each outfall, List latitude and longitude to the nearest second and the name of the receiving waters			
Outfall Number	Latitude	Longitude	Receiving Surface Waters
001	46 34' 24"	105 41' 34"	Kinsey Upper Canal to Yellowstone
002			
003			
004			
005			

Map: Attach a topographic map extending one mile beyond the property boundaries or the site activity identified in Section B depicting the facility or activity boundaries, major drainage patterns, and the receiving surface waters, stated above. Also identify the specific location of the production area, and land application area(s).

Is the receiving water on the 303(d) list for nutrients (nitrogen and/or phosphorus) ☐ Yes ☒ No

In the event of an extraordinary rainfall event, Outfall #1 (Kinsey Upper Canal to Yellowstone) is the route for any discharge from the feedlot facility which located at the end of the VTAs.

Section H – Concentration Animal Feeding Operation Characteristics

Waste Production, Storage and Disposal

	Animal type	Number in Open Confinement	Number Housed Under Roof
<input type="checkbox"/>	Mature Dairy Cows		
<input type="checkbox"/>	Dairy Heifers		
<input type="checkbox"/>	Veal Calves		
<input checked="" type="checkbox"/>	Cattle (not dairy or veal)	3500	
<input type="checkbox"/>	Swine (55 lbs or over)		
<input type="checkbox"/>	Swine (55 lbs or under)		
<input type="checkbox"/>	Horses		
<input type="checkbox"/>	Sheep or Lambs		
<input type="checkbox"/>	Turkeys		
<input type="checkbox"/>	Chickens (broilers)		
<input type="checkbox"/>	Chickens (layers)		
<input type="checkbox"/>	Ducks		
<input type="checkbox"/>	Other (Specify: _____)		
<input type="checkbox"/>	Other (Specify: _____)		
<input type="checkbox"/>	Other (Specify: _____)		

Manure, Litter and/or Wastewater Production and Use.

How much manure, litter, and process wastewater is generated annually by the facility?

Solid (tons): 2889 T Liquid/Slurry (gallons): none

If land applied, how many acres of land under control of the permit applicant are available to apply the manure, litter, or process wastewater generated from the facility? (Note: Do not include setback distances in available acreage)
700 Acres

How much manure, litter, and process wastewater is transferred to other persons per year? (estimated) Solid (tons): none Liquid/Slurry (gallons): none

Were the containment structures built after February 2006? Y

- ☒ Do the waste containment structures have 10 feet of separation between the pond bottom and any bedrock formations? Y
- ☒ Do the waste containment structures have 4 feet of separation from the pond bottom and any ground water? Y
- ☒ Were any of the waste containment structures built within 500 feet of any existing well? N

Type of Containment/Storage	Total Capacity	Units (gallons or tons)	Days of Storage
<input type="checkbox"/> Anaerobic Lagoon			
<input type="checkbox"/> Storage Pond #1			
<input type="checkbox"/> Storage Pond #2			
<input type="checkbox"/> Storage Pond #3			
<input type="checkbox"/> Storage Pond #4			
<input type="checkbox"/> Storage Pond #5			
<input type="checkbox"/> Above Ground Storage Tank			
<input type="checkbox"/> Below Ground Storage Tank #1			
<input type="checkbox"/> Below Ground Storage Tank #2			
<input type="checkbox"/> Underfloor Pits			
<input type="checkbox"/> Roofed Storage Shed			
<input type="checkbox"/> Concrete Pad			
<input type="checkbox"/> Impervious Soil Pad			
<input checked="" type="checkbox"/> Other (Specify: VTAs)	6.2	Acre	
<input type="checkbox"/> Other (Specify: Collection Basins)	1.5	Acre	

Physical Data for CAFO

Nutrient Management Plan

All Concentrated Animal Feeding Operations seeking permit coverage after July 31, 2007 are required to complete and implement a Nutrient Management (NMP). The NMP must be submitted to the Department using the form provided by the Department (Form NMP). Check the box below that applies and provide the required information. The NMP must be developed in accordance with ARM 17.30.1334 and implemented upon the effective date of permit coverage. (Check One)

- ☒ Does the facility have an NMP?
 Date NMP was developed: 7/5/17
 Date NMP was last modified: na

☐ NMP has not been prepared; provide detailed explanation below

Section I – Supplemental Information

Section J - CERTIFICATION**Permittee Information:**

This Form NMP must be completed, signed, and certified as follows:

- For a corporation, by a principal officer of at least the level of vice president;
- For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
- For a municipality, state, federal, or other public facility, by either a principal executive officer or ranking elected official.

All Permittees Must Complete the Following Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information; including the possibility of fine and imprisonment for knowing violations. [75-5-633, MCA]

A. Name (Type or Print)

Louise Hinesbauer

B. Title (Type or Print)**C. Phone No.****D. Signature****E. Date Signed**

7/7/17

The Department will not process this form until all of the requested information is supplied, and the appropriate fees are paid. Return this form (NOI) and the applicable fee to:

Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, MT 59620-0901
(406) 444-3080

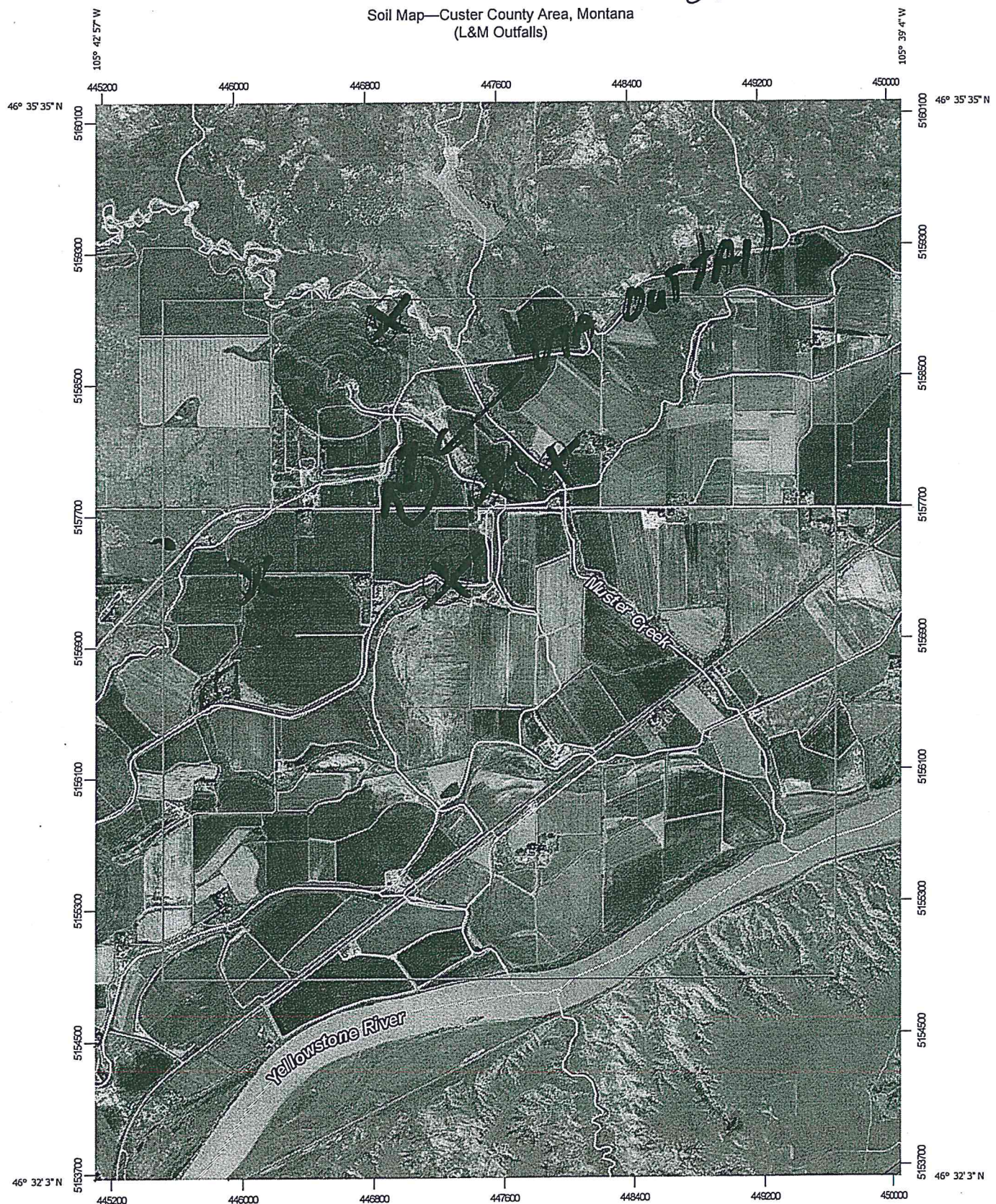
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DEQ WATER QUALITY DIVISION

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OUTFALLS

Soil Map—Custer County Area, Montana
(L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.



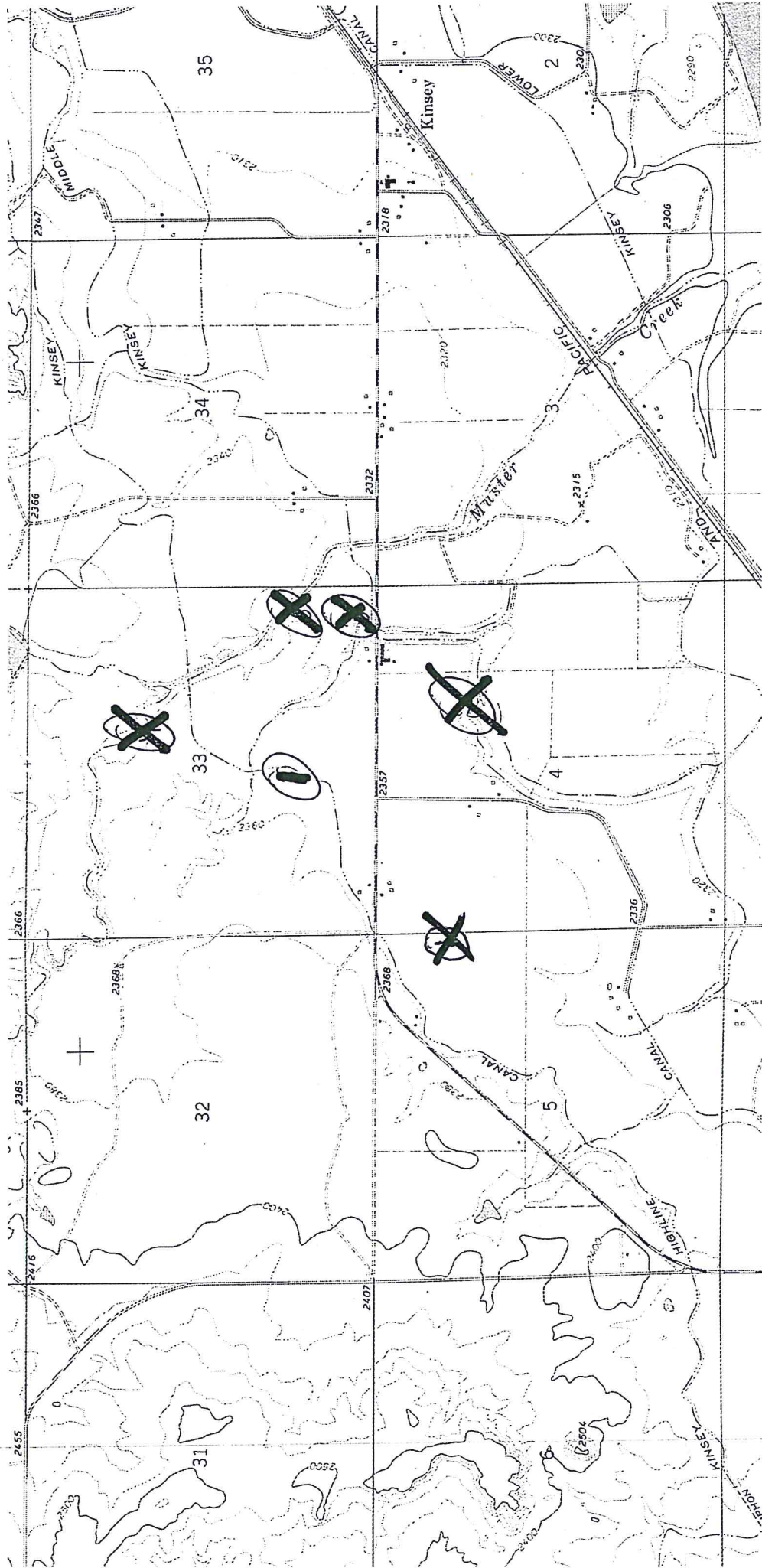
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

A topographic map of the Kinsey area, showing a grid of sections 31 through 35. The map includes contour lines, a river labeled 'Kinsey', and a 'PACIFIC CREEK'. Handwritten annotations include: a circled '1' in section 33; a circled 'X' in section 33; a circled 'X' in section 34; a circled 'X' in section 35; a circled 'X' in section 32; and a circled 'X' in section 31. The map also shows 'KINSEY CREEK' and 'KINSEY CANAL'.



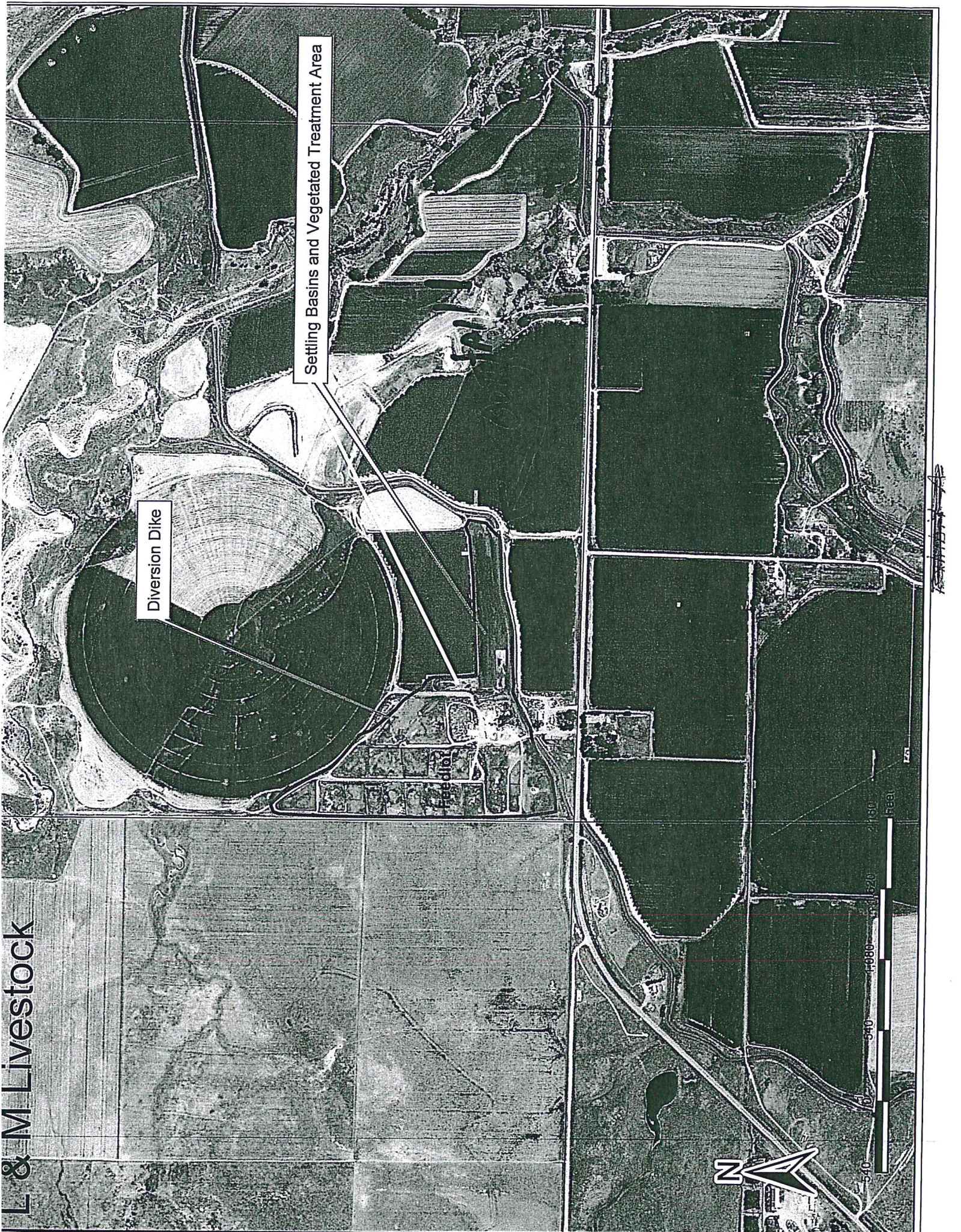
L & M Livestock

Diversion Dike

Settling Basins and Vegetated Treatment Area

Feedlot

501



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DEQ WATER QUALITY DIVISION

FORM
NMP

Nutrient Management Plan

READ THIS BEFORE COMPLETING FORM: Before completing this form (Form NMP), Concentrated Animal Feeding Operation (CAFO) operators need to read the General Permit, particularly Part IV.A. CAFO operators also need to read the "Instructions For filling out Form NMP," found at the back of this form. Form NMP is intended to help CAFO operators develop a site-specific Nutrient Management Plan, in compliance with Part IV.A of the General Permit and all applicable State rules and statutes. Your Nutrient Management Plan must be maintained at the site as required in Part III of the General Permit. Sections B and C on your Form NMP must state the information exactly the same way as it was stated on the most recently submitted version of your NOI-CAFO. Attach additional pages as necessary, indicating the corresponding section number on this NMP form. The 2013 General Permit, current fee schedule, and related forms are available from the Water Protection Bureau at (406) 444-3080 or <http://www.deq.mt.gov/wqinfo/MPDES/CAFO.asp>

Section A – NMP Status:

- ☒ New No prior NMP submitted for this site.
- ☐ Resubmitted Previous NMP found incomplete.
- ☐ Modification Change or update to existing NMP.
- ☐ New 2013 New 2013 version of NMP.

Section B – Facility Information:

Facility Name L&M Livestock, LLC Feedlot

Facility Location Kinsey MT @ 16 Mile Marker on Kinsey Rd

Nearest City of Town Miles City County Custer

Section C – Applicant (Owner/Operator Information):

Owner or Operator Name L&M Livestock, LLC / Loren Hinebauch

Mailing Address 2003 Main St

City, State, and Zip code Miles City, MT 59301

Facility Phone Number 406-951-0101

Email mary_hinebauch@hotmail.com

Section D – NMP Minimum Elements:**1. Livestock Statistics**

Animal Type and number of animals	# of Days on Site (per year)	Annual Manure Production (tons, cu. yds. or gal
1. Beef Cattle - 3500 hd	172	2889 T
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Method used for estimating annual manure production:
DEQ 9 Table 2

2. Manure Handling**a. Describe Manure handling at the facility:**

Manure is left in the pens through the winter. Pens are scraped and manure is piled in the pens in the summer and fall. Manure is either

- loaded into spreading equipment and hauled directly to the field being spread -or-
- hauled to the fields to be spread and temporarily stockpiled until fields are harvested

b. Frequency of Manure Removal from confinement areas:

Annually

c. Is this manure temporarily stored in any location other than the confinement area? ☒ Yes ☐ No

If so then how and where?

Temporary manure stockpiles at the fields are placed at the highest possible elevation and temporary berms are constructed to ensure no upgradient clean water flows into the stockpile and to also ensure rainwater falling on the stockpile cannot escape the stockpile area. In all cases manure stockpiles are located at least 200 ft from any outfall locations.

d. Is manure stored on impervious surface? ☐ Yes ☒ No

If yes, describe type and characteristics of this surface:

3. Waste Control Structures					
Waste Control Structures (name/type)	Length (ft.)	Width (ft.)	Depth (ft.)	Volume (cubic ft. or gallons)	Number of days of storage
1. VTA - North	700'	100'	1'	na	na
2. VTA - Center	1300'	100'	1'	na	na
3. VTA - South	1000'	70'	1'	na	na
4. Collect. Basin N	100'	100'	0.7'	na	na
5. Collect. Basin C	340'	100'	0.8'	na	na
6. Collect. Basin S	300'	70'	0.85'	na	na
7. Please Refer	to	NRCS	Design		
8.					
9.					
10.					
11.					
12.					

What is the 24 hr. 25 yr. storm event at this facility 2.6"

Production area: 31 acres. Type of lot (dirt or paved): dirt

Area contributing drainage form outside CAFO that enters confinement areas and waste storage, conveyance, or treatment structures: 0 acres.

What is the annual precipitation during the critical storage period 4"

How much freeboard do the pond(s) have 1'

4. Disposal of Dead Animals.

Describe how dead animals are disposed of at this facility:

Any dead animals are removed from their pens within 24 hrs. A dead animal disposal pit is located northeast of the feedlot on the NE side of Field 5 (Lat 46 34' 50.7" Long 105 41'32.1") at a "High and Dry" location. Dead animals are stored at the edge of the pit no longer than 30 days. Every 30 days or less, the dead animals are pushed into the pit and covered with at least 2' of soil.

5. Clean Water Diversion Practices

Describe how clean water is diverted from production area:

Clean water is diverted around the feedlot by dikes and ditches designed by the NRCS. Please refer to the NRCS design on file.

6. Prohibiting Animals and Wastes from Contact with State Waters

Describe how animals and wastes are prohibited from direct contact with state waters:

All animals are contained in their pens away from State Waters. Waste water is diverted into collection basins (three) and then into vegetative treatment areas (three). Basins and VTAs are fenced to exclude livestock.

Describe how Chemicals and other contaminants are handled on-site:

Chemicals used in support of the farming operation are pesticides and fertilizers. All are used in accordance to product and safety designs and manufactures labels. Chemicals are stored inside buildings that are in the same area but outside any waste water drainages and never come into contact with livestock or waste water.

7. Best Management Practice (BMPS)

Describe in detail all temporary, permanent and structural BMPS which will be used to control runoff of pollutants from facility's production area. Indicate the location of these measures. If BMPS are not installed include a schedule for implementation of each of these measures. Examples of BMP measures could include but are not limited to: constructing ditches, terraces,, and waterways above and open lot to divert clean water run on; installing gutters, downspouts and buried conduits to divert roof drainage; providing more roofed area: decreasing open lot surface area; repairing of adjusting water systems to minimize water wastage; using practical amounts of water for cooling purposes; recycling water if practical and applicable.

Production Area BMP's

- Diversion dikes, collection basins, and VTAs in accordance with the NRCS design.

Please refer to the NRCS design for all BMPs.

Describe in detail all temporary, permanent and structural Best Management Practices (BMPs) which will be used to control runoff of pollutants from facility's land production area. Indicate the location of these practices. If not already in use, include a schedule for implementation of each of these measures. Attached details and specifications may be used to supplement this description. Examples of BMP measures could include but are not limited to: maintaining setbacks from surface waters for manure applications; managing irrigation practices to prevent ponding of wastewater on land application sites;

never spray irrigating waste on to frozen ground: consulting with the Department prior to applying any liquid waste to frozen or snow-covered ground; applying wastes at agronomic rates.

Land Application BMP's

- Setbacks of 100' are used on every field receiving manure.
- Manure is not applied to frozen ground.
- Manure is applied at agronomic rates usually limited to 3 yrs phosphorus removal.
- Grass filled drains and grassy buffer strips are used to limit manure leaving fields with drain or storm water.

Buffers ☒ Yes ☐ No

Conservation Tillage ☒ Yes ☐ No

Constructed Wetlands ☐ Yes ☒ No

Grass Filter ☒ Yes ☐ No

Infiltration Field ☐ Yes ☒ No

Residue Management ☒ Yes ☐ No

Set backs ☒ Yes ☐ No

Terrace ☐ Yes ☒ No

Other examples

8. Implementation, Operation, Maintenance and Record Keeping – Guidance

The permittee is required to develop guidance addressing implementation of NMP, proper operation and maintenance of the facility, and record keeping as described in Part 2 of the permit.

Has a guidance document been developed for the facility? ☒ Yes ☐ No

Certify the document address the following requirements:

Implementation of the NMP: ☒ Yes ☐ No

Facility operation and maintenance: ☒ Yes ☐ No

Record keeping and reporting ☒ Yes ☐ No

Sample collection and analysis: ☒ Yes ☐ No

Manure transfer ☐ Yes ☒ No

Provide name, date and location of most recent documentation:

L&M Feedlot Operations Plan, 7/5/17, Posted at the L&M Shop and on file at the L&M office in Miles City.

If your answer to any of the above question is no, provide explanation:
L&M does not intend to transfer any manure off their farm.

Section E – Land Application

Will manure be land applied to land either owned, rented, or leased by the owner or operator of the facility?

- ☒ Yes If yes, then the information requested in Section E must be provided.
☐ No If no, then provide an explanation of how animal waste at this facility are managed.

Photos and/or Maps

Attach an aerial photograph or map of the site where manure is to be applied. (Use multiple photos/maps if necessary to show required details.) The photo(s)/map(s) must be printed on no larger than an 11"X 17" piece of paper, and must clearly identify the following items:

- Individual field boundaries for all planned land application areas
- A name, number, letter or other means of identifying each individual land application field
- The location of any downgradient surface waters.
- The location of any downgradient open tile line intake structures
- The location of any downgradient sinkholes
- The location of any downgradient agricultural well heads
- The location of all conduits to surface waters
- The specific manure/waste handling or nutrient management restrictions associated with each land application field
- The soil type(s) present and their locations within the individual land application field(s)
- The location of buffers and setbacks around state surface waters, well heads, etc.

Land Application Equipment Calibration

Describe the type of equipment used to land apply wastes and the calibration procedures:

Manure is applied with a dry spreader. Net weights of manure are documented. See Attached plan.

Manure Sampling and Analysis Procedures

A representative manure sample will be analyzed a minimum of once annually for Total Nitrogen, and Total Phosphorus. Analysis results will be reported in lbs/ton or lbs/1,000 gal. Results of these analyses will be used in determining rates for manure, litter, and process wastewater.

Manure Sample collection will occur according to ARM 17.30.1334

Yes

Other (describe)

Soil Sampling and Analysis Procedures

Representative soil (composite) samples from the top 6 inches layer of soil for each field where manure will be applied must be analyzed for phosphorus content at least once every three years. Analyses will be conducted by a qualified laboratory, using the Olsen P test. Results will be reported in parts per million (ppm) and will be used in determining application rates for manure, litter, and process wastewater

Soil samples collection will occur according the methods in ARM 17.30.1334

Yes

Other (describe)

Phosphorus Risk Assessment

The permittee shall assess the risk of phosphorus contamination of state waters. An assessment shall be conducted for each field, under the control of the operator, to which manure, litter or process wastewater will or

may be applied. If a new field is added in the future, then the permittee must submit a revised (modified) NMP. The permittee has the option of using Method A or Method B (below) to complete the assessment. Copies of all tables and calculations used to complete the assessments, as well as the results of the assessments, shall be submitted to the Department and copies shall be maintained on-site at the facility and available for Departmental review. The results of the assessments shall be used to determine the appropriate basis for land application of wastes from the facility.

Method Used

Indicate which method will be used to determine phosphorus application:

Method A – Representative Soil Sample

Method B – Phosphorus Index

Method A – Representative Soil Sample

- Obtain one or more representative soil sample(s) from the field per 17.30.1334
- Have the sample analyzed for Phosphorus by a qualified lab. The “Olsen P test” must be used for the analysis, and the result must be reported in parts per million (ppm)
- Using the results of the Olsen P test, determine application basis according to the Table below.

Soil Test

Olsen P Soil Test Results (ppm)	Application Basis
<25.0	Nitrogen Needs of Crop
25.1 - 100.0	Phosphorus Needs of Crop
100.0 – 150.0	Phosphorus Needs up to Crop Removal Rate
>150.0	No Application allowed

Method B – Phosphorus Index

- Complete a phosphorus Index according to the crop grown on each field. Complete table in Appendix A to calculate phosphorus index. For information on filling out specific sections in Appendix A, please refer to the method as described in Natural Resource Conservation Service (NRCS), Agronomy Technical Note MT-77 (rev3), January 2006.
- Using the calculated Total Phosphorus Index Value, assign the overall site/field vulnerability to phosphorus loss according to the table below.

Total Phosphorus

Total Phosphorus Index Value	Site Vulnerability to Phosphorus Loss
<11	Low
11-21	Medium
22-43	High
>43	Very High

- Using the calculated Site Vulnerability to Phosphorus Loss, determine the appropriate application basis according to the table below.

Site Vulnerability to Phosphorus Loss	Application Basis
Low	Nitrogen Needs
Medium	Nitrogen Needs
High	Phosphorus Need Up to Crop Removal
Very High	Phosphorus Crop Removal or No Application

The applicant has 2 ways in which to report how manure or process wastewater application rates can be reported to DEQ.

1. Linear Approach. Expresses rates of application as pounds of nitrogen and phosphorus. CAFOs selecting the linear approach to address rates of application must include in the NMP submitted to the permitting authority the following information for each crop, field, and year covered by the NMP, which will be used by the permitting authority to establish site-specific permit terms:

- The maximum application rate (pounds/acre/year of nitrogen and phosphorus) from manure, litter, and process wastewater.
- The outcome of the field-specific assessment of the potential for nitrogen and phosphorus transport from each field. [If a state does not have an N transport risk assessment, the NMP must document any basis for assuming that nitrogen will be fully used by crops.] The CAFO must specify any conservation practices used in calculating the risk rating.
- The crops to be planted or any other uses of a field such as pasture or fallow fields.
- The realistic annual yield goal for each crop or use identified for each field.
- The nitrogen and phosphorus recommendations from in ARM 17.30.1334 (technical standard) for each crop or use identified for each field.
- Credits for all residual nitrogen in each field that will be plant-available.
- Consideration of multi-year phosphorus application. For any field where nutrients are applied at a rate based on the crop phosphorus requirement, the NMP must account for single-year nutrient applications that supply more than the crop's annual phosphorus requirement.
- All other additions of plant available nitrogen and phosphorus (i.e., from sources other than manure, litter, or process wastewater or credits for residual nitrogen).
- The form and source of manure, litter, and process wastewater to be land-applied.
- The timing and method of land application. The NMP also must include storage capacities needed to ensure adequate storage that accommodates the timing indicated.
- The methodology that will be used to account for the amount of nitrogen and phosphorus in the manure, litter, and wastewater to be applied.
- Any other factors necessary to determine the maximum application rate identified in accordance with this Linear Approach.

2. Narrative Rate Approach. Expresses a narrative rate of application that results in the amount, in tons or gallons, of manure, litter, and process wastewater to be land applied. CAFOs selecting the narrative rate approach to address rates of application must include in the NMP submitted to the permitting authority the following information for each crop, field, and year covered by the NMP, which will be used by the permitting authority to establish site-specific permit terms:

- The maximum amounts of nitrogen and phosphorus that will be derived from all sources of nutrients (pounds/acre for each crop and field).
- The outcome of the field-specific assessment of the potential for nitrogen and phosphorus transport from each field. The CAFO must specify any conservation practices used in calculating the risk rating.
- The crops to be planted in each field or any other uses of a field such as pasture or fallow fields, including alternative crops if applicable. Any alternative crops included in the NMP must be listed by field, in addition to the crops identified in the planned crop rotation for that field.
- The realistic annual yield goal for each crop or use identified for each field for each year, including any alternative crops identified.
- The nitrogen and phosphorus recommendations from *[the permitting authority to specify acceptable sources]* for each crop or use identified for each field, including any alternative crops identified.
- The methodology (including formulas, sources of data, protocols for making determination, etc.) and actual data that will be used to account for: (1) the results of soil tests required by Parts II.A.4.b and III.A.3.g of this

- permit, (2) credits for all nitrogen in the field that will be plant- available, (3) the amount of nitrogen and phosphorus in the manure, litter, and process wastewater to be applied, (4) consideration of multi-year phosphorus application (for any field where nutrients are applied at a rate based on the crop phosphorus requirement, the methodology must account for single-year nutrient applications that supply more than the crop's annual phosphorus requirement), (5) all other additions of plant available nitrogen and phosphorus to the field (i.e., from sources other than manure, litter, or process wastewater or credits for residual nitrogen), (6) timing and method of land application, and (7) volatilization of nitrogen and mineralization of organic nitrogen.
- Any other factors necessary to determine the amounts of nitrogen and phosphorus to be applied in accordance with the Narrative Rate Approach.
 - NMPs using the Narrative Rate Approach must also include the following projections, which will not be used by the permitting authority in establishing site-specific permit terms:
 - i. Planned crop rotations for each field for the period of permit coverage.
 - ii. Projected amount of manure, litter, or process wastewater to be applied.
 - iii. Projected credits for all nitrogen in the field that will be plant-available.
 - iv. Consideration of multi-year phosphorus application.
 - v. Accounting for other additions of plant-available nitrogen and phosphorus to the field.
 - vi. The predicted form, source, and method of application of manure, litter, and process wastewater for each crop
 - If the receiving water is on the 303(d) list for nutrients then the narrative rate approach must be used.
- a. For the Linear Approach the permittee will complete the Nutrient Budget Worksheet, below, for the next 5 years to which manure or process waste water is or may be applied. A copy of each Nutrient Budget Worksheet will be maintained on site, and a copy will be submitted to the Department.

Nutrient Budget Worksheet Summary

8 Fields (6 to spread in 2017 and 2 for 2018)

358 acres to be spread

9292 ton of manure

Nutrient Budget Worksheet

Field identification: 15 Year: 2017 Spread - 2018 Grow Crop: Corn Silage				
Expected Crop Yield: 26 ton/yr				
Phosphorus index results or Phosphorus application from soil test: 19 - Index				
Method of Application: Dry Spread				
When will application occur: 10/17				
Nutrient Budget		Nitrogen- based Application	Phosphorus- based Application	Source of Information
1	Crop Nutrient Needs lb/acre	234.0	124.8	EB 161
2	(-) Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-) Residuals from past manure production lb/acre	0.0	0.0	
4	(-) Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-) Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6	= Additional Nutrients Needed, lb/acre	234.0	124.8	
7	Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x) Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9	= Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10	Additional Nutrients needed, lbs/acre (calculated above)	234.0	124.8	
11	(/) Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12	= Manure Application Rate, tons/acre or 1000 gal/acre	26.1	14.9	

Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 15	Acres: 12.4
Soil Type(s): 79A Yamacall Loam, 0-2% 41A Eapa Loam 0-2%	
Phosphorus Index: 19	OK to apply at N needs Olsen: 20

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Corn	Corn	Corn	Corn	Corn	Corn
Yield t/a	26	26	26	26	26	26

Assessment Narrative

L&M plans to spread manure on field 15 in the fall of 2017 and grow silage corn through at least 2022. The field will be flood irrigated with furrows. Runoff from 15 is directed to a very long (about 1.5 mile) grassy ditch leading to a larger combined drain that either recycles back to the irrigation company canal or discharges to the river. A setback of 100' is used to limit manure entering the drain ditch. Application will be based on nitrogen needs. The Olsen test was relatively high on 15 so after the manure application in 2017, no more manure should be applied until about 10/2020. The single application will almost supply two years of P, but after the third year in corn the Olsen should come down slightly. Commercial N will be required for the 2019 and 2020 crop years.

Application Instructions

Apply manure at a rate to supply one yr of N.		
26.1	Ton Manure/acre	on 12.4 acres
For a total of: 324.20112 Tons With a dry spreader.		
In the Fall of 2017	This will supply:	219.62011 # P2O5/acre

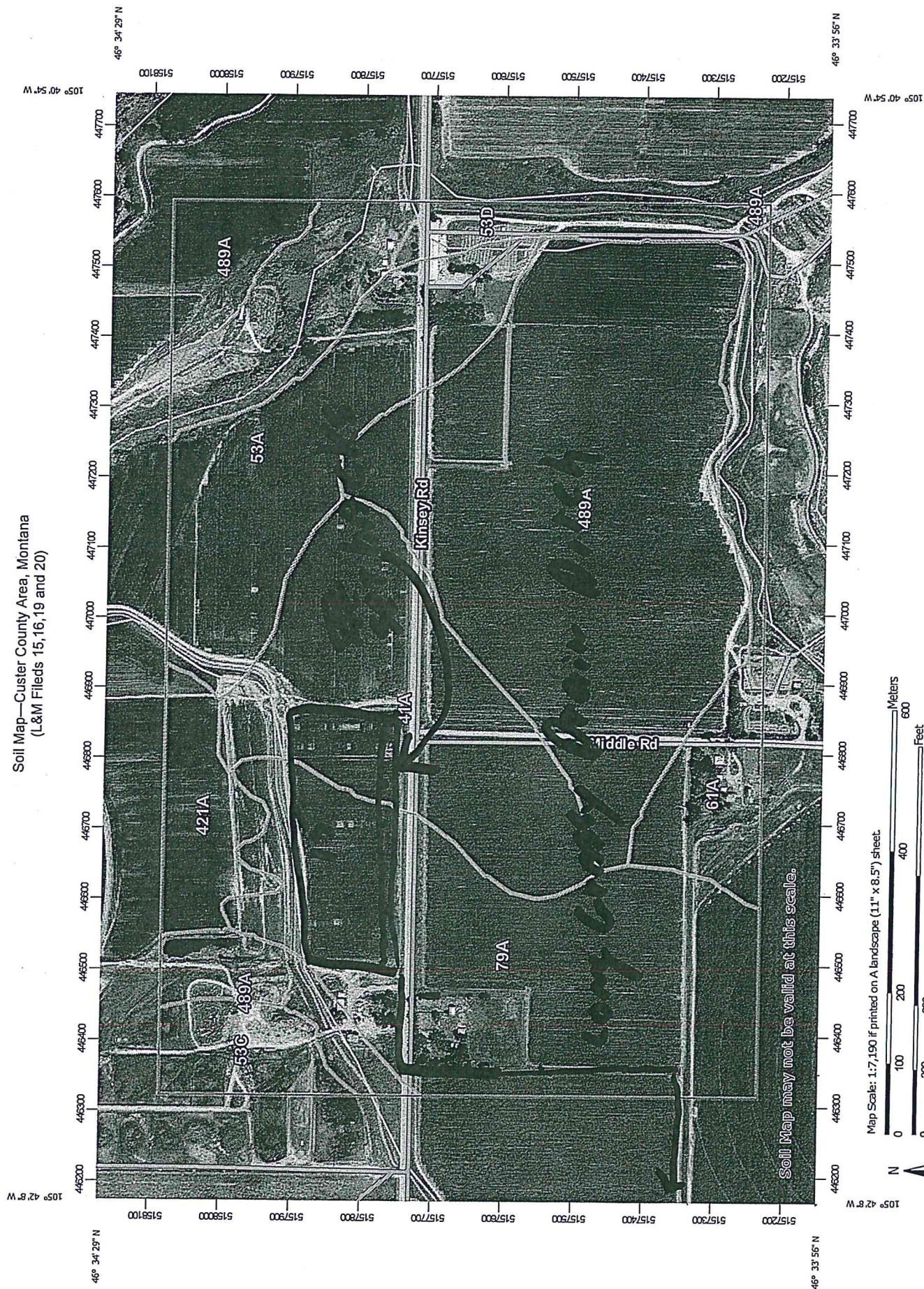
Calculation Box 1 Phosphorus Removal Rates

Year	2018	2019	2020	2021	2022
Crop	Corn	Corn	Corn	Corn	Corn
Yield t/a	26	26	26	26	26
P2O5 Uptake Rate #/t	4.8	4.8	4.8	4.8	4.8 (EB 161)
Total for Year	124.8	124.8	124.8	124.8	124.8
Total for three years after apreading:			374.4		

Calculation Box 2 Nitrogen Needs

For one yr (2018 of corn Silage):	26 ton
Corn Silage needs:	9 lb N per ton (EB 161)
Nitrogen Needs:	234 N availability as affected by application = 50%

Soil Map—Custer County Area, Montana
(L&M Fileds 15, 16, 19 and 20)



Soil Map—Custer County Area, Montana
(L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.

0 450 900 1800 2700 Meters

0 1500 3000 6000 9000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84




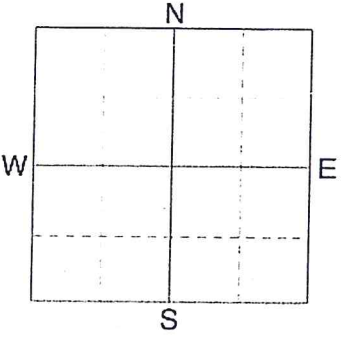
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National Cooperative Soil Survey

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Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field: 15		Crop: Corn Silage		Year: 2018 - 2020				
Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Soil Erosion	NA	<5 tons/as/yr	5-10 ton/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils	1	X 1.5	1.5
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils	2	X 1.5	3
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes	NA	X 1.5	0
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	1	X 0.5	0.5
Olson Soil Test P	—	<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	2	X 0.5	1
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges		X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205		X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop.	Surface applied to pasture or >3 months before crop emerges	4	X 1.0	4
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	1	X 1.0	1
Total Phosphorus Index Value: 19								

 <p>Soil Analysis by Agvise Laboratories (http://www.agvise.com) Northwood: (701) 587-6010 Benson: (320) 843-4109</p>	SOIL TEST REPORT	
<p>SUBMITTED FOR: Loran Hinebaugh</p> <p>Miles City, MT</p> <p>Date Sampled _____</p>	<p>FIELD ID 15 SAMPLE ID _____ FIELD NAME 15 COUNTY _____ TWP _____ RANGE _____ SECTION _____ QTR _____ ACRES 0 PREV. CROP Corn-Silage</p> <p>SUBMITTED BY: CE0557 AG PARTNERS-MILES CITY 319 ATLANTIC BOX 1440 MILES CITY, MT 59301</p>	<p>REF # 1917981 BOX # 0 LAB # NW34389</p>
<p>Date Received 06/19/2017 Date Reported 6/21/2017</p>		

Nutrient In The Soil		Interpretation				1st Crop Choice			2nd Crop Choice			3rd Crop Choice			
Nitrate	0-12"	206 lb/ac	VLow	Low	Med	High	Corn-Silage								
			*****	*****	*****	*****	YIELD GOAL			YIELD GOAL			YIELD GOAL		
							29 Tons								
							SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
							University								
Olsen	20 ppm	*****	*****	*****	*****	LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		
Phosphorus		*****	*****	*****	*****	N	95		N			N			
Potassium	247 ppm	*****	*****	*****	*****	P ₂ O ₅	15	Band (2x2) *	P ₂ O ₅			P ₂ O ₅			
Chloride	0-12"	84 lb/ac	*****	*****	*****	*****	K ₂ O	10	Band (2x2) *	K ₂ O			K ₂ O		
			*****	*****	*****	*****	Cl	0		Cl			Cl		
Sulfur	0-12"	56 lb/ac	*****	*****	*****	*****	S	0		S			S		
Boron	1.1 ppm	*****	*****	*****	*****	*****	B	0		B			B		
Zinc	1.99 ppm	*****	*****	*****	*****	*****	Zn	0		Zn			Zn		
Iron	16.7 ppm	*****	*****	*****	*****	*****	Fe	0		Fe			Fe		
Manganese	3.0 ppm	*****	*****	*****	*****	*****	Mn	0		Mn			Mn		
Copper	1.17 ppm	*****	*****	*****	*****	*****	Cu	0		Cu			Cu		
Magnesium	589 ppm	*****	*****	*****	*****	*****	Mg	0		Mg			Mg		
Sodium	77 ppm	*****	*****	*****	*****	*****	Lime			Lime			Lime		
Org.Matter	2.8 %	*****	*****	*****	*****	*****									
Carbonate(CCE)	0.5 %	***													
0-12"	0.62 mmho/cm	*****	*****	*****	*****										
Sol. Salts															

Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)				
			% Ca	% Mg	% K	% Na	% H
0-6" 7.6		24.0 meq	(65-75) 75.5	(15-20) 20.4	(1-7) 2.6	(0-5) 1.4	(0-5)

General Comments: Fine Loams (CEC range 21 to 30) (Medium)

Crop 1: Soil Nitrogen level is estimated at 206 lbs/acre. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 104 K2O = 241 University guidelines will build P & K soil test levels to the medium range over many years.

Nutrient Budget Worksheet

Field identification: 16					Year: 2018 Spread 2019 Grow					Crop: Corn Silage				
Expected Crop Yield: 26 ton/yr														
Phosphorus index results or Phosphorus application from soil test: 19 - Index														
Method of Application: Dry Spread														
When will application occur: 10/18														
Nutrient Budget					Nitrogen- based Application			Phosphorus- based Application			Source of Information			
1		Crop Nutrient Needs lb/acre			234.0			124.8			EB 161			
2	(-)	Credits from previous legume crops, lb/ac			0.0			0.0						
3	(-)	Residuals from past manure production lb/acre			0.0			0.0						
4	(-)	Nutrients supplied by commercial fertilizer and Biosolids, lb/acre			0.0			0.0						
5	(-)	Nutrients supplied in irrigation water lb/acre			0.0			0.0						
6		= Additional Nutrients Needed, lb/acre			234.0			124.8						
7		Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)			17.9			8.4			Manure Test 6/7/2016			
8	(x)	Nutrient Availability factor, for Phosphorus based application use 1.0			0.50			1.0						
9		=Available Nutrients in Manure, lbs/ton or lb/1000 gal			9.0			8.4						
10		Additional Nutrients needed, lbs/acre (calculated above)			234.0			124.8						
11	(/)	Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)			9.0			8.4						
12		=Manure Application Rate, tons/acre or 1000 gal/acre			26.1			14.9						

Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P.

Nutrient Budget Worksheet

Field identification: 16 Year: 2017 Spread 2018 Grow Crop: Corn Silage

Expected Crop Yeld: 26 ton/yr

Phosphorus index results or Phosphorus application from soil test: 19 - Index

Method of Application: Dry Spread

When will application occur: 10/17

Nutrient Budget			Nitrogen- based Application	Phosphorus- based Application	Source of Information
1		Crop Nutrient Needs lb/acre	234.0	124.8	EB 161
2	(-)	Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-)	Residuals from past manure production lb/acre	0.0	0.0	
4	(-)	Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-)	Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6		= Additional Nutrients Needed, lb/acre	234.0	124.8	
7		Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x)	Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9		=Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10		Additional Nutrients needed, lbs/acre (calculated above)	234.0	124.8	
11	(/)	Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12		=Manure Application Rate, tons/acre or 1000 gal/acre	26.1	14.9	

Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 16	Acres: 42
Soil Type(s): 53A Kobase Silty Clay Loam, 0-2% 41A Eapa Loam 0-2%	
Phosphorus Index: 19	OK to apply at N needs Olsen: 4

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Corn	Corn	Corn	Corn	Corn	Corn
Yield t/a	26	26	26	26	26	26

Assessment Narrative

L&M plans to spread manure on field 16 in the fall of 2017 and again in the fall of 2018 and grow silage corn through at least 2022. The field will be flood irrigated with furrows. Runoff from 16 is directed to a long grassy drainage (about 1.5 miles) which recycles back to a irrigation company canal. A setback of 100' is used to limit manure entering the drain ditch. Application will be based on N needs. The Olsen test was relatively low on field 16 so manure will be applied based on N needs for two successive years (10/2017 and 10/2018). The successive years application should result in a modest increase in the Olsen results in the the third and fourth year. Commercial N will be required for the 2020 crop year.

Application Instructions

Apply manure at a rate to supply one yr of N.		
26.1	Ton Manure/acre	on 42 acres
For a total of: 1098.1006 Tons With a dry spreader.		
In the Fall of 2017 & 18 This will supply : 219.62011 # P2O5/acre/yr		

Calculation Box 1 Phosphorus Removal Rates

	Year	2018	2019	2020	2021	2022
	Crop	Corn	Corn	Corn	Corn	Corn
	Yeild t/a	26	26	26	26	26
P205 Uptake Rate #/t		4.8	4.8	4.8	4.8	4.8 (EB 161)
Total for Year		124.8	124.8	124.8	124.8	124.8
Total for three years after apreading:				374.4		

Calculation Box 2 Nitrogen Needs

For one yr (2018 of corn Silage):	26 ton
Corn Silage needs:	9 lb N per ton (EB 161)
Nitrogen Needs:	234 N availability as affected by application = 50%

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 16	Acres: 42
Soil Type(s): 53A Kobase Silty Clay Loam, 0-2%	
41A Eapa Loam 0-2%	
Phosphorus Index: 19	OK to apply at N needs
Olsen: 4	

Field Crop History, Plan and Yield Estimates

Year	Crop	Yield t/a
2017	Corn	26
2018	Corn	26
2019	Corn	26
2020	Corn	26
2021	Corn	26
2022	Corn	26

Assessment Narrative

L&M plans to spread manure on field 16 in the fall of 2017 and grow silage corn through at least 2022. The single application of manure in 2017 will supply phosphorus equal to crop removal for three years. The fields will be flood irrigated with furrows. Runoff from 16 is directed to a long grassy drainage (about 1.5 miles) which recycles back to the irrigation company canal. A setback of 100' is used to limit manure entering the drain ditch. After the single manure application, no more manure should be applied until at least 9/2020. Even though the Budget Worksheet allows for more, L&M has a self imposed limit of 30 ton per acre.

Application Instructions

Apply manure at a rate to supply three years of Phosphorus.	30	Ton Manure/acre	on 42	acres
For a total of:	1260	Tons	With a dry spreader.	
In the Fall of 2017	This will supply:			
	360 # P2O5/acre			

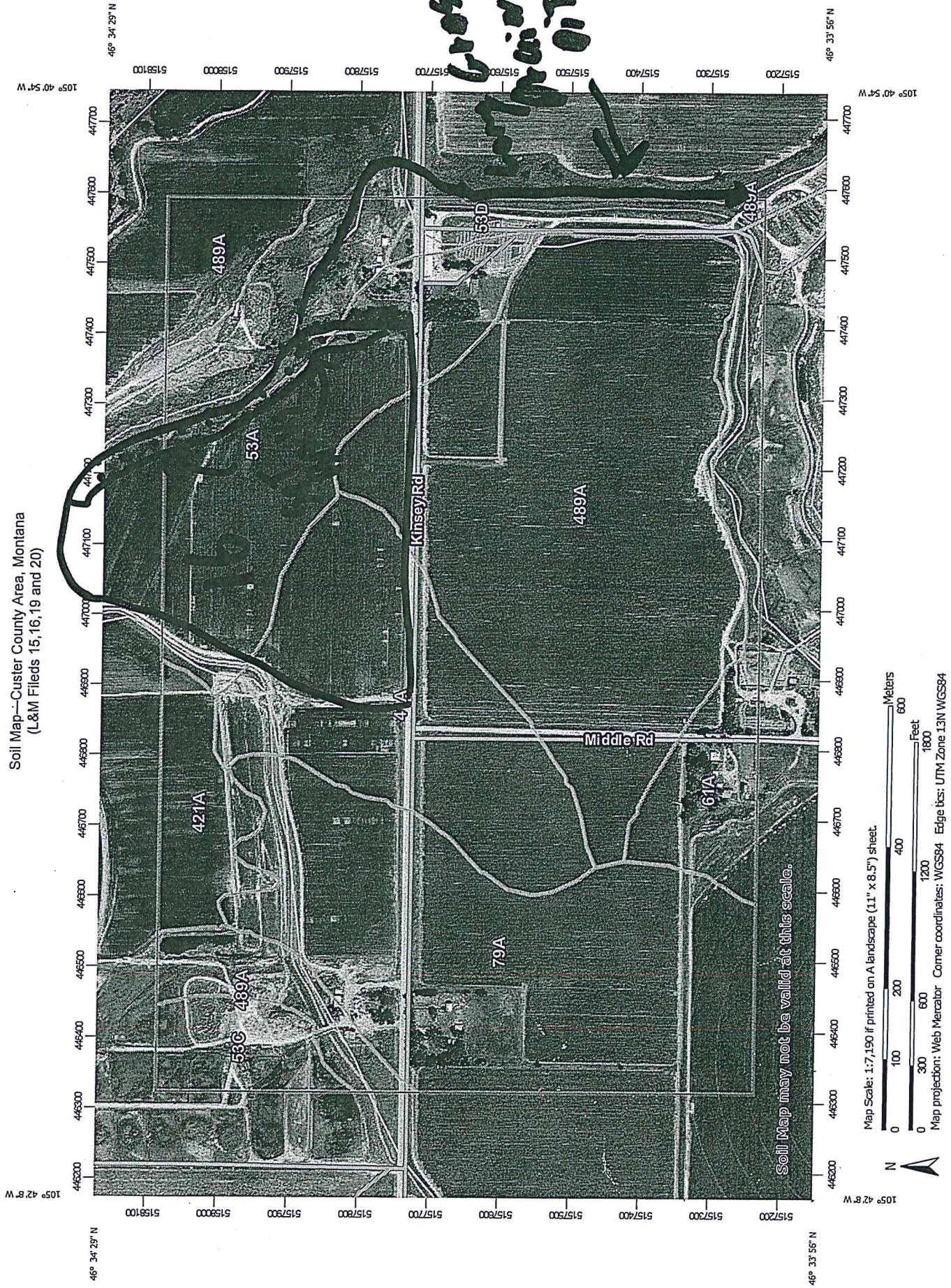
Calculation Box 1 Phosphorus Removal Rates

Year	Crop	Yield t/a	P205 Uptake Rate #/t	Total for Year	Total for three years after apreading:
2018	Corn	26	4.8	124.8	124.8
2019	Corn	26	4.8	124.8	124.8
2020	Corn	26	4.8	124.8	124.8
2021	Corn	26	4.8	124.8	124.8
2022	Corn	26	4.8	124.8	124.8
					374.4

Calculation Box 2 Nitrogen Needs

For one yr (2018 of corn Silage):	26	ton
Corn Silage needs:	9	lb N per ton (EB 161)
Nitrogen Needs:	234	
N availability as affected by application = 50%, and Mineralization = 55%		

Soil Map—Custer County Area, Montana
(L&M Fileds 15, 16, 19 and 20)



Soil Map—Custer County Area, Montana
(L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

7/2/2017
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Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field: 16		Crop: Corn		Year: 2018-2020				
Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Soil Erosion	NA	<5 tons/as/yr	5-10 ton/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils	1	X 1.5	1.5
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils	2	X 1.5	3
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes	N/A	X 1.5	0
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	2	X 0.5	1
Olson Soil Test P	-----	<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	1	X 0.5	0.5
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges		X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205		X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop.	Surface applied to pasture or >3 months before crop emerges	4	X 1.0	4
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	1	X 1.0	1
Total Phosphorus Index Value:						19		

Nutrient In The Soil		Interpretation				1st Crop Choice			2nd Crop Choice			3rd Crop Choice			
<div>Nitrate</div>	0-12"	130 lb/ac	VLow	Low	Med	High	Corn-Silage								
			*****	*****	*****	*****	YIELD GOAL			YIELD GOAL			YIELD GOAL		
							29 Tons								
							SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
							University								
			LB/ACRE		APPLICATION		LB/ACRE		APPLICATION		LB/ACRE		APPLICATION		
Olsen	4 ppm	*****				N	170		N			N			
Phosphorus						P ₂ O ₅	120	Broadcast	P ₂ O ₅			P ₂ O ₅			
Potassium	157 ppm	*****	*****	*****	*****	K ₂ O	10	Band (2x2) *	K ₂ O			K ₂ O			
<div>Chloride</div>	0-12"	86 lb/ac	*****	*****	*****	*****	Cl	0		Cl			Cl		
							S	0		S			S		
							B	0		B			B		
							Zn	0		Zn			Zn		
							Fe	0		Fe			Fe		
							Mn	0		Mn			Mn		
<div>Sulfur</div>	0-12"	60 lb/ac	*****	*****	*****	*****	Cu	0		Cu			Cu		
							Mg	0		Mg			Mg		
							Lime			Lime			Lime		
Boron	1.0 ppm	*****	*****	***											
Zinc	1.68 ppm	*****	*****	*****	****										
Iron	11.9 ppm	*****	*****	*****	*****										
Manganese															
Copper	2.4 ppm	*****	*****	*****	*										
Magnesium	1.09 ppm	*****	*****	*****	*****										
Calcium	513 ppm	*****	*****	*****	*****										
Sodium	5782 ppm	*****	*****	*****	*****										
Org.Matter	73 ppm	*****	*****												
Carbonate(CCE)	2.2 %	*****	*****												
<div>Sol. Salts</div>	0-12"	0.53 mmho/cm	*****	*****	*****										
						Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)						
									% Ca	% Mg	% K	% Na	% H		
						0-6" 8.0		33.9 meq	(65-75) 85.3	(15-20) 12.6	(1-7) 1.2	(0-5) 0.9	(0-5)		

General Comments: Texture is not estimated on high pH soils.

Crop 1: Soil Nitrogen level is estimated at 130 lbs/acre. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 104 K2O = 241 University guidelines will build P & K soil test levels to the medium range over many years.

Nutrient Budget Worksheet

Field identification: 17-18 Year: 2017 Spread 2018 Grow Crop: Corn Silage					
Expected Crop Yield: 26 ton/yr					
Phosphorus index results or Phosphorus application from soil test: 19 - Index					
Method of Application: Dry Spread					
When will application occur: 10/17					
Nutrient Budget			Nitrogen- based Application	Phosphorus- based Application	Source of Information
1		Crop Nutrient Needs lb/acre	234.0	124.8	EB 161
2	(-)	Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-)	Residuals from past manure production lb/acre	0.0	0.0	
4	(-)	Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-)	Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6		= Additional Nutrients Needed, lb/acre	234.0	124.8	
7		Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x)	Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9		=Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10		Additional Nutrients needed, lbs/acre (calculated above)	234.0	124.8	
11	(/)	Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12		=Manure Application Rate, tons/acre or 1000 gal/acre	26.1	14.9	

Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P. -

Nutrient Budget Worksheet

Field identification: 17-18 Year: 2018 Spread 2019 Grow Crop: Corn Silage				
Expected Crop Yieild: 26 ton/yr				
Phosphorus index results or Phosphorus application from soil test: 19 - Index				
Method of Application: Dry Spread				
When will application occur: 10/18				
Nutrient Budget		Nitrogen- based Application	Phosphorus- based Application	Source of Information
1	Crop Nutrient Needs lb/acre	234.0	124.8	EB 161
2	(-) Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-) Residuals from past manure production lb/acre	0.0	0.0	
4	(-) Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-) Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6	= Additional Nutrients Needed, lb/acre	234.0	124.8	
7	Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x) Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9	= Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10	Additional Nutrients needed, lbs/acre (calculated above)	234.0	124.8	
11	(/) Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12	= Manure Application Rate, tons/acre or 1000 gal/acre	26.1	14.9	

Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 17 and 18	Acres: 39	
Soil Type(s): 53A Kobase Silty Clay Loam, 0-2%		81A Creed Loam 0-2%
489A Spinekop Silty Clay Loam, 0-2%		61A Marias Silty Clay 0-2%
Phosphorus Index: 19	OK to apply at N needs	Olsen: 5

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Corn	Corn	Corn	Corn	Corn	Corn
Yield t/a	26	26	26	26	26	26

Assessment Narrative

L&M plans to spread manure on fields 17 and 18 in the fall of 2017 and again in the fall of 2018 and grow silage corn through at least 2022. The fields will be flood irrigated with furrows. Runoff is directed to a very long (about 1 mile) grassy ditch leading to a larger combined drain that either recycles back to the irrigation company canal or discharges to the river. A setback of 100' is used to limit manure entering the drain ditch. Application will be based on N needs. The Olsen test was relatively low on fields 17 and 18 so manure will be applied based on N needs for two successive years (10/2017 and 10/2018). The successive years application should result in a modest increase in the Olsen results in the third and fourth year. Commercial N will be required for the 2020 crop year.

Application Instructions

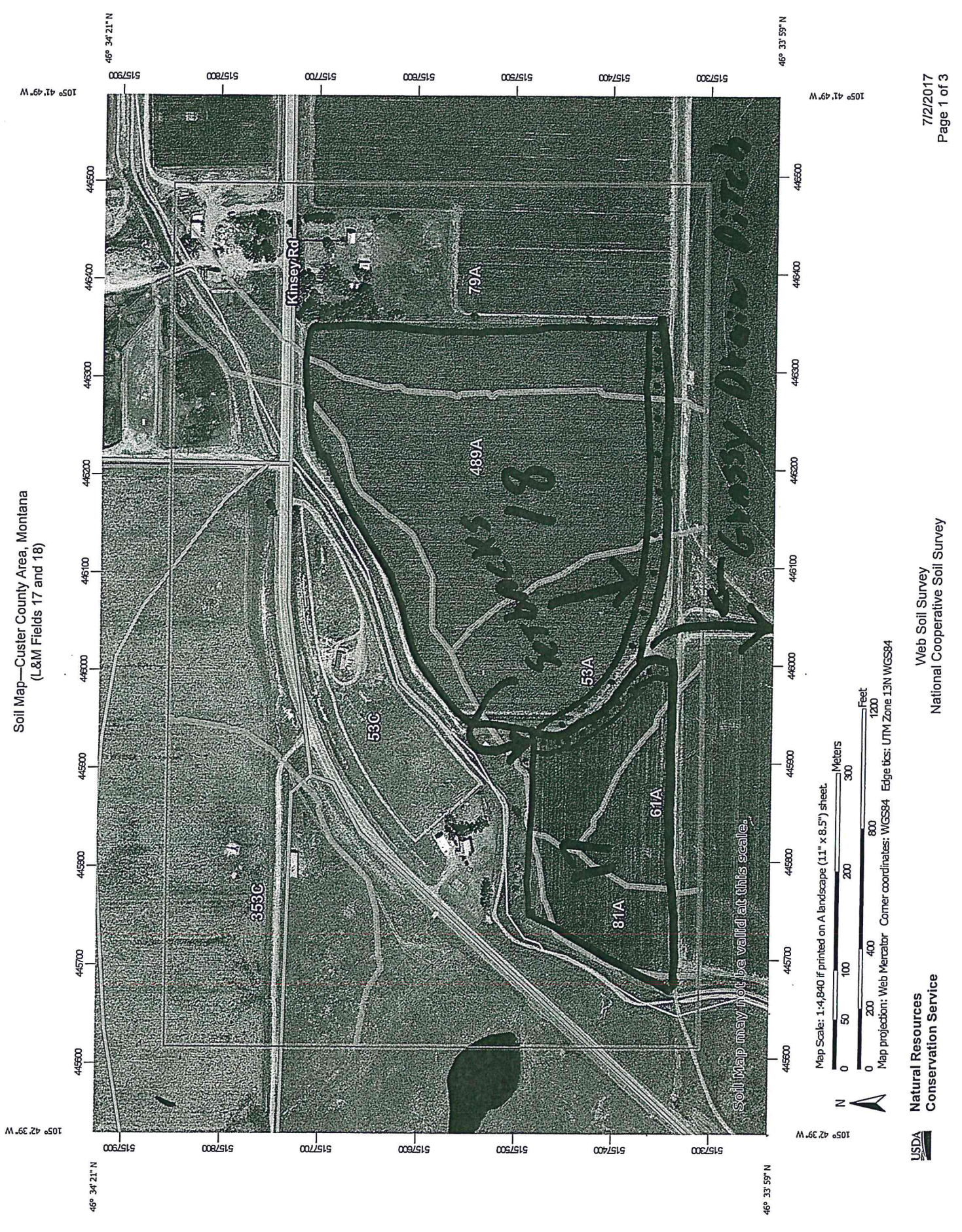
Apply manure at a rate to supply one yr of N.		
26.1	Ton Manure/acre	on 39 acres
For a total of: 1019.6648 Tons With a dry spreader.		
In the Fall of 2017 & 18 This will supply: 219.62011 # P2O5/acre/yr		

Calculation Box 1 Phosphorus Removal Rates

	Year	2018	2019	2020	2021	2022
	Crop	Corn	Corn	Corn	Corn	Corn
	Yield t/a	26	26	26	26	26
P2O5 Uptake Rate #/t		4.8	4.8	4.8	4.8	4.8 (EB 161)
Total for Year		124.8	124.8	124.8	124.8	124.8
Total for three years after apreading:				374.4		

Calculation Box 2 Nitrogen Needs

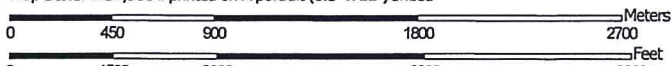
For one yr (2018 of corn Silage):	26 ton
Corn Silage needs:	9 lb N per ton (EB 161)
Nitrogen Needs:	234 N availability as affected by application = 50%



Soil Map—Custer County Area, Montana
(L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84




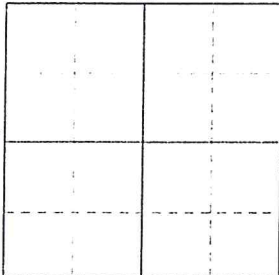
Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

7/2/2017
Page 1 of 4

Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field	Crop: <u>Corn</u>					Year: <u>2018-2020</u>		
Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Soil Erosion	NA	<5 tons/as/yr	5-10 ton/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils	1	X 1.5	1.5
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils	2	X 1.5	3
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes	NA	X 1.5	0
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	2	X 0.5	1
Olson Soil Test P		<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	1	X 0.5	0.5
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges	0	X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	0	X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges	4	X 1.0	4
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	1	X 1.0	1
Total Phosphorus Index Value:						19		

 <p>Soil Analysis by Agvise Laboratories (http://www.agvise.com) Northwood: (701) 587-6010 Benson: (320) 843-4109</p>	SOIL TEST REPORT FIELD ID 17,18 SAMPLE ID FIELD NAME 17,18 COUNTY TWP RANGE SECTION QTR ACRES 0 PREV. CROP Corn-Silage	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">N W E S</div>  </div>
SUBMITTED FOR: Loran Hinebaugh Miles City, MT	SUBMITTED BY: CE0557 AG PARTNERS-MILES CITY 319 ATLANTIC BOX 1440 MILES CITY, MT 59301	REF # 1917983 BOX # 0 LAB # NW34390
Date Sampled _____ Date Received 06/19/2017 Date Reported 6/21/2017		

Nutrient In The Soil		Interpretation				1st Crop Choice			2nd Crop Choice			3rd Crop Choice				
Nitrate	0-12"	440 lb/ac	VLow	Low	Med	High	Corn-Silage									
			*****	*****	*****	*****	YIELD GOAL			YIELD GOAL			YIELD GOAL			
							29 Tons									
							SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			
							University									
			LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION								
Phosphorus	Olsen	5 ppm	*****			N	10		N			N				
Potassium		111 ppm	*****	*****	*****	P ₂ O ₅	110	Broadcast	P ₂ O ₅			P ₂ O ₅				
Chloride	0-12"	30 lb/ac	*****	*****		K ₂ O	80	Broadcast	K ₂ O			K ₂ O				
	0-12"	32 lb/ac	*****	*****	*****	Cl	0		Cl			Cl				
Sulfur						S	0		S			S				
Boron		0.9 ppm	*****	*****	*	B	0		B			B				
Zinc		1.34 ppm	*****	*****	*****	Zn	0		Zn			Zn				
Iron		6.2 ppm	*****	*****	*****	Fe	0		Fe			Fe				
Manganese		2.2 ppm	*****	*****	*****	Mn	0		Mn			Mn				
Copper		0.95 ppm	*****	*****	*****	Cu	0		Cu			Cu				
Magnesium		620 ppm	*****	*****	*****	Mg	0		Mg			Mg				
Calcium		5462 ppm	*****	*****	*****	Lime			Lime			Lime				
Sodium		48 ppm	*****	*												
Org.Matter		1.9 %	*****	*												
Carbonate(CCE)		6.0 %	*****	*****	*****											
Sol. Salts	0-12"	1.08 mmho/cm	*****	*****	*****	Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)							
						0-6"	7.9		33.0 meq	% Ca	% Mg	% K	% Na	% H		
									(65-75) 82.8	(15-20) 15.7	(1-7) 0.9	(0-5) 0.6	(0-5)	(0-5)		

General Comments: Texture is not estimated on high pH soils.

Crop 1: Soil Nitrogen level is estimated at 440 lbs/acre. Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 104 K2O = 241 University guidelines will build P & K soil test levels to the medium range over many years.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 19 and 20	Acres: 98.9	
Soil Type(s): 79A Yamacall Loam, 0-2%		41A Eapa Loam 0-2%
489A Spinekop Silty Clay Loam, 0-2%		
Phosphorus Index: 18.5	OK to apply at N needs	Olsen: 10

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Corn	Corn	Corn	Corn	Corn	Corn
Yield t/a	26	26	26	26	26	26

Assessment Narrative

L&M plans to spread manure on fields 19 and 20 in the fall of 2017 and again in 2018 and grow silage corn through at least 2022. The fields will be flood irrigated with furrows. Runoff from 19 directed to a very long (about 1 mile) grassy ditch leading to a larger combined drain that either recycles back to the irrigation company canal or discharges to the river. Field 20 runoff flows over a grassy strip about 50' wide and into an irrigation company canal. A setback of 100' is used to limit manure entering the ditches. Application will be based on N needs. The Olsen test was relatively low on fields 19 and 20 so manure will be applied based on N needs for two successive years (10/2017 and 10/2018). The successive years application should result in a modest increase in the Olsen results in the third and fourth year. Commercial N will be required for the 2020 crop year.

Application Instructions

Apply manure at a rate to supply one yr of N.		
26.1	Ton Manure/acre	on 98.9 acres
For a total of: 2585.7654 Tons With a dry spreader.		
In the Fall of 2017 & 18 This will supply: 219.62011 # P2O5/acre/yr		

Calculation Box 1 Phosphorus Removal Rates

Year	2018	2019	2020	2021	2022	
Crop	Corn	Corn	Corn	Corn	Corn	
Yield t/a	26	26	26	26	26	
P205 Uptake Rate #/t	4.8	4.8	4.8	4.8	4.8	(EB 161)
Total for Year	124.8	124.8	124.8	124.8	124.8	
Total for three years after apreading:			374.4			

Calculation Box 2 Nitrogen Needs

For one yr (2018 of corn Silage):	26 ton
Corn Silage needs:	9 lb N per ton (EB 161)
Nitrogen Needs:	234 N availability as affected by application = 50%

Nutrient Budget Worksheet

Field identification: 19 & 20 Year: 2017 Spread 2018 Grow Crop: Corn Silage				
Expected Crop Yield: 26 ton/yr				
Phosphorus index results or Phosphorus application from soil test: 18.5 - Index				
Method of Application: Dry Spread				
When will application occur: 10/17				
Nutrient Budget		Nitrogen- based Application	Phosphorus- based Application	Source of Information
1	Crop Nutrient Needs lb/acre	234.0	124.8	EB 161
2	(-) Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-) Residuals from past manure production lb/acre	0.0	0.0	
4	(-) Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-) Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6	= Additional Nutrients Needed, lb/acre	234.0	124.8	
7	Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x) Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9	=Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10	Additional Nutrients needed, lbs/acre (calculated above)	234.0	124.8	
11	(/) Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12	=Manure Application Rate, tons/acre or 1000 gal/acre	26.1	14.9	

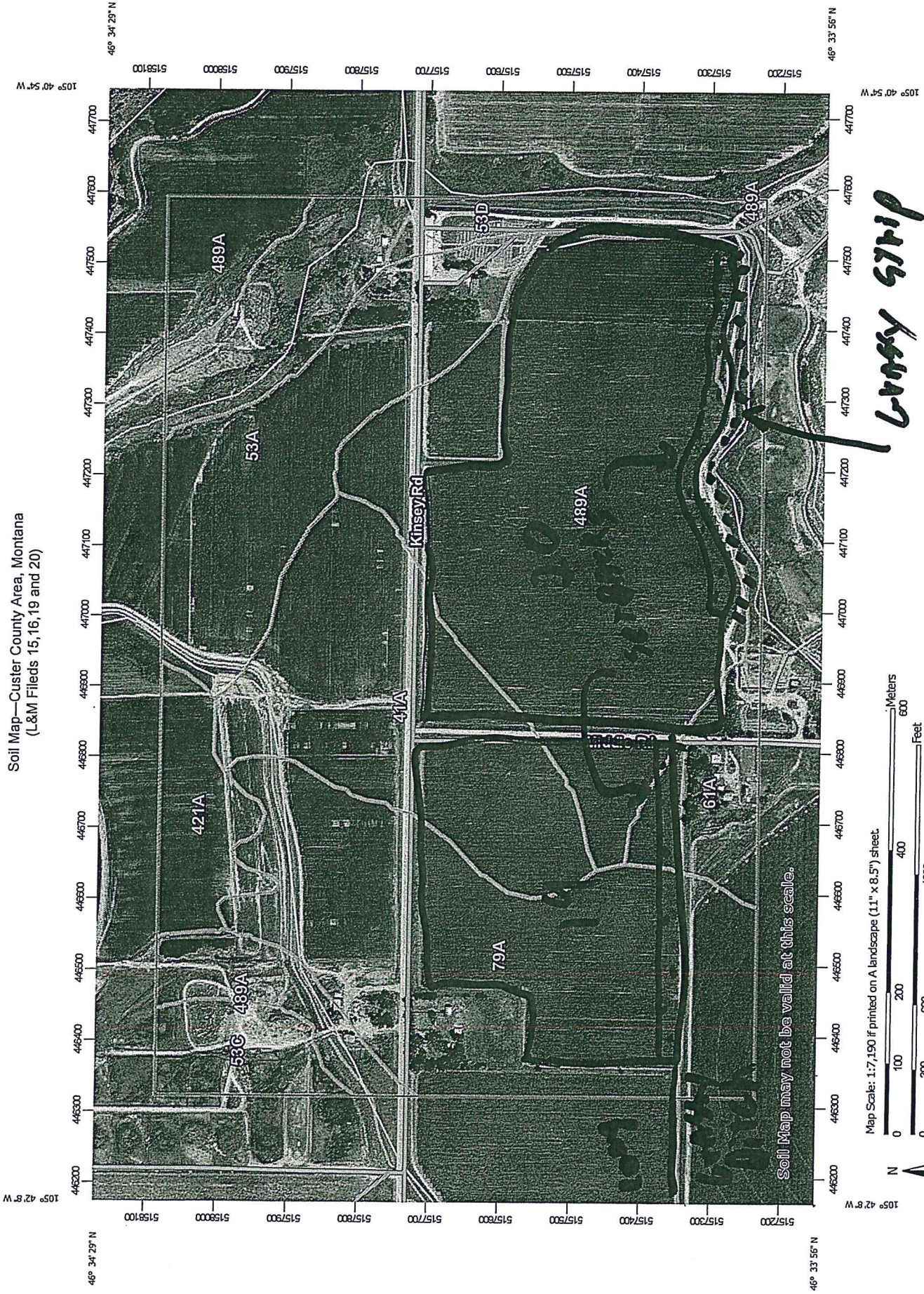
Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P.

Nutrient Budget Worksheet

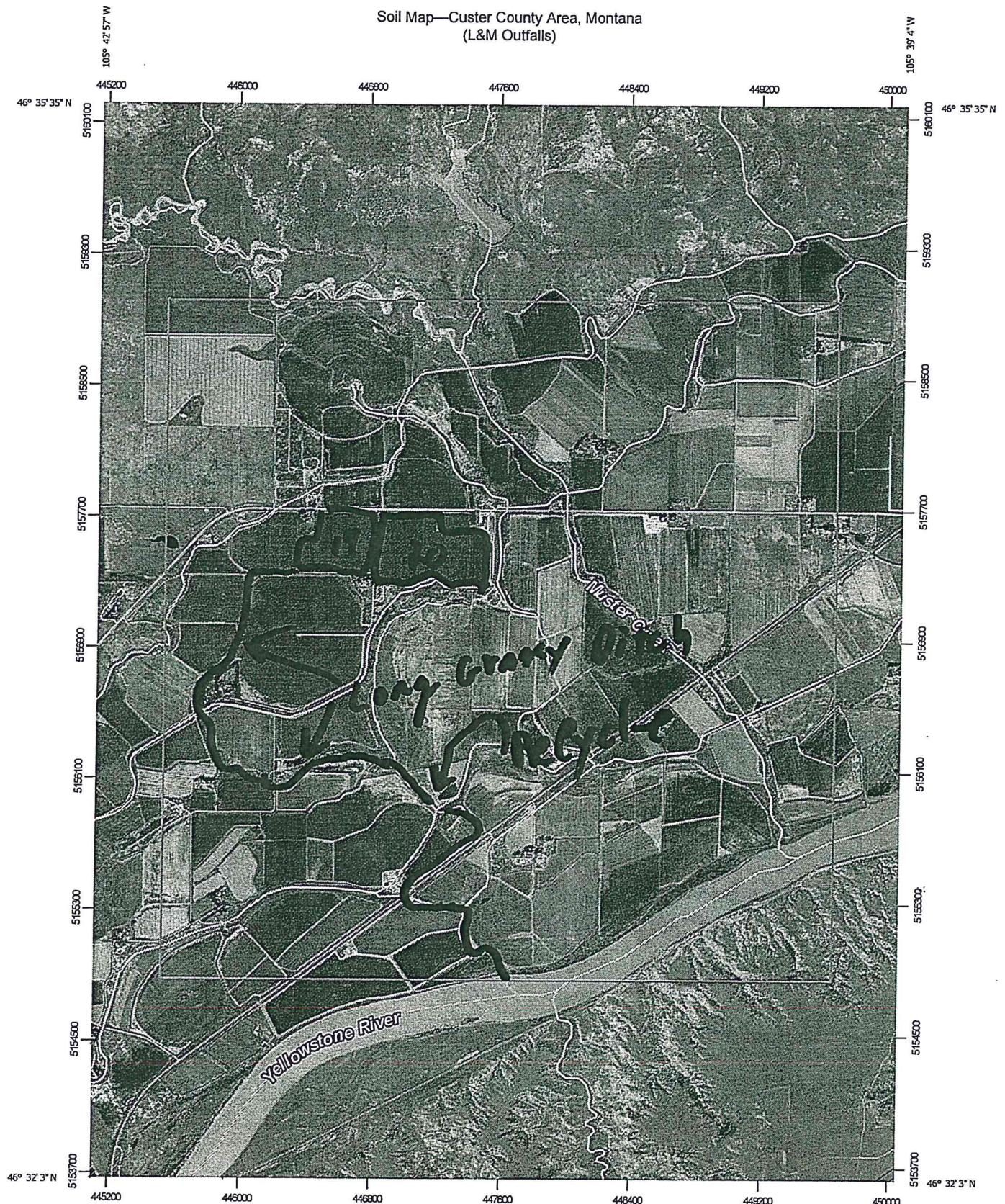
Field identification: 19 & 20 Year: 2018 Spread 2019 Grow Crop: Corn Silage				
Expected Crop Yield: 26 ton/yr				
Phosphorus index results or Phosphorus application from soil test: 18.5 - Index				
Method of Application: Dry Spread				
When will application occur: 10/18				
Nutrient Budget		Nitrogen- based Application	Phosphorus-based Application	Source of Information
1	Crop Nutrient Needs lb/acre	234.0	124.8	EB 161
2	(-) Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-) Residuals from past manure production lb/acre	0.0	0.0	
4	(-) Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-) Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6	= Additional Nutrients Needed, lb/acre	234.0	124.8	
7	Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x) Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9	=Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10	Additional Nutrients needed, lbs/acre (calculated above)	234.0	124.8	
11	(/) Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12	=Manure Application Rate, tons/acre or 1000 gal/acre	26.1	14.9	

Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P.

Soil Map—Custer County Area, Montana
(L&M Fileds 15, 16, 19 and 20)



Soil Map—Custer County Area, Montana (L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.




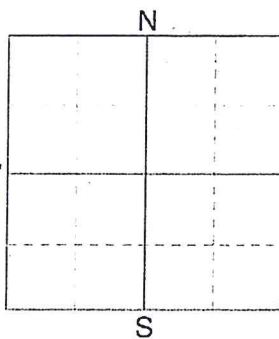
Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

7/2/2017
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Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field: 19420		Crop: Corn		Year: 2018-2020				
Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Soil Erosion	NA	<5 tons/as/yr	5-10 ton/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils	1	X 1.5	1.5
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils	2	X 1.5	3
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes	0 N/A	X 1.5	0
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	1	X 0.5	0.5
Olson Soil Test P	-----	<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	1	X 0.5	0.5
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges		X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205		X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop.	Surface applied to pasture or >3 months before crop emerges	4	X 1.0	4
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	1	X 1.0	1
Total Phosphorus Index Value:						18.5		

 <p>Soil Analysis by Agvise Laboratories (http://www.agvise.com) Northwood: (701) 587-6010 Benson: (320) 843-4109</p>	SOIL TEST REPORT FIELD ID 19,20 SAMPLE ID FIELD NAME 19,20 COUNTY TWP RANGE SECTION QTR ACRES 0 PREV. CROP Corn-Silage	<div style="display: flex; justify-content: space-between; align-items: center;"> W  E </div>
SUBMITTED FOR: Loran Hinebaugh Miles City, MT	SUBMITTED BY: CE0557 AG PARTNERS-MILES CITY 319 ATLANTIC BOX 1440 MILES CITY, MT 59301	REF # 1917984 BOX # 0 LAB # NW34342
Date Sampled _____ Date Received 06/16/2017 Date Reported 6/21/2017		

Nutrient In The Soil		Interpretation				1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
		VLow	Low	Med	High	Corn-Silage					
Nitrate	0-12" 204 lb/ac	*****	*****	*****	*****	YIELD GOAL		YIELD GOAL		YIELD GOAL	
						29 Tons					
						SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
						University					
						LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Olsen Phosphorus	10 ppm	*****	*****	*****	*****	N 100		N		N	
Potassium	209 ppm	*****	*****	*****	*****	P ₂ O ₅ 60	Broadcast	P ₂ O ₅		P ₂ O ₅	
Chloride	0-12" 58 lb/ac	*****	*****	*****	*****	K ₂ O 10	Band (2x2) *	K ₂ O		K ₂ O	
						Cl 0		Cl		Cl	
						S 0		S		S	
Sulfur	0-12" 44 lb/ac	*****	*****	*****	*****	B 0		B		B	
Boron	1.2 ppm	*****	*****	*****	*****	Zn 0		Zn		Zn	
Zinc	1.59 ppm	*****	*****	*****	*****	Fe 0		Fe		Fe	
Iron	11.6 ppm	*****	*****	*****	*****	Mn 0		Mn		Mn	
Manganese	3.4 ppm	*****	*****	*****	*****	Cu 0		Cu		Cu	
Copper	1.23 ppm	*****	*****	*****	*****	Mg 0		Mg		Mg	
Magnesium	556 ppm	*****	*****	*****	*****	Lime		Lime		Lime	
Calcium	5731 ppm	*****	*****	*****	*****						
Sodium	67 ppm	*****	*****	*****	*****						
Org. Matter	2.8 %	*****	*****	*****	*****						
Carbonate(CCE)	2.9 %	*****	*****	*****	*****						
	0-12" 0.62 mmho/cm	*****	*****	*****	*****						
Sol. Salts											
						Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)		
									% Ca	% Mg	% K
						0-6" 7.9		34.1 meq	(65-75) 84.0	(15-20) 13.6	(1-7) 1.6
									(0-5) 0.9	(0-5) 0.9	

General Comments: Texture is not estimated on high pH soils.

Crop 1: Soil Nitrogen level is estimated at 204 lbs/acre. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 104 K2O = 241 University guidelines will build P & K soil test levels to the medium range over many years.

Nutrient Budget Worksheet

Field identification: 5a Year: 2017 Spread 2018 Grow Crop: Corn Silage					
Expected Crop Yield: 26 ton/yr					
Phosphorus index results or Phosphorus application from soil test: 18.5 - Index					
Method of Application: Dry Spread					
When will application occur: 10/17					
Nutrient Budget			Nitrogen- based Application	Phosphorus- based Application	Source of Information
1		Crop Nutrient Needs lb/acre	234.0	124.8	EB 161
2	(-)	Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-)	Residuals from past manure production lb/acre	0.0	0.0	
4	(-)	Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-)	Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6		= Additional Nutrients Needed, lb/acre	234.0	124.8	
7		Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x)	Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9		=Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10		Additional Nutrients needed, lbs/acre (calculated above)	234.0	124.8	
11	(/)	Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12		=Manure Application Rate, tons/acre or 1000 gal/acre	26.1	14.9	

Comments: Application rate based on N needs. 26.1 t/a will also supply almost two years of P.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 5a	Acres: 72
Soil Type(s): 57C Lonna Silt Loam, 2-8%	421A Gerdrum-Creed complex, 0-2%
53C Kobase Silty Clay Loam, 2-8%	
Phosphorus Index: 18.5	OK to apply at N needs
	Olsen: 16

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Corn	Corn	Corn	Corn	Corn	Corn
Yield t/a	26	26	26	26	26	26

Assessment Narrative

L&M plans to spread manure on field 5a in the fall of 2017 and grow silage corn through at least 2022. The field will be sprinkler irrigated. Most of Field 5a runoff is directed to a very long (about 1.5 mile) grassy drainage leading to recycle into an irrigation company canal. Part of Field 5a runoff flows over a grassy strip about 100' wide and into Muster Creek. A setback of 100' is used to limit manure entering either drainage. Application will be based on nitrogen needs. The Olsen test was relatively high on 5a so after the manure application in 2017, no more manure should be applied until about 10/2020. The single application will almost supply two years of P, but after the third year in corn the Olsen should come down slightly. Commercial N will be required for the 2019 and 2020 crop years.

Application Instructions

Apply manure at a rate to supply one yr of N.
26.1 Ton Manure/acre on 72 acres
For a total of: 1882.4581 Tons With a dry spreader.
In the Fall of 2017 This will supply: 219.62011 # P2O5/acre

Calculation Box 1 Phosphorus Removal Rates

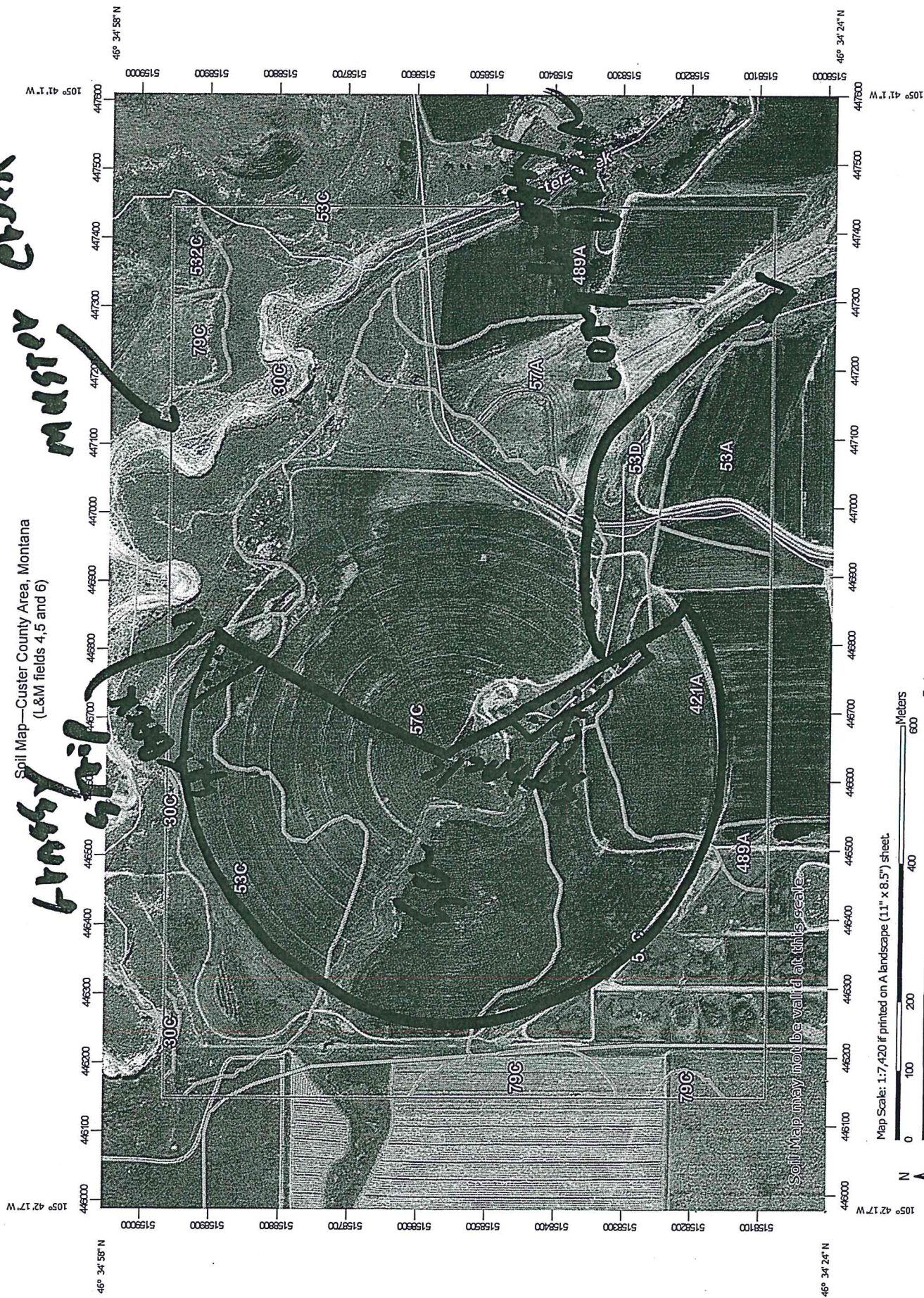
Year	2018	2019	2020	2021	2022
Crop	Corn	Corn	Corn	Corn	Corn
Yield t/a	26	26	26	26	26
P2O5 Uptake Rate #/t	4.8	4.8	4.8	4.8	4.8 (EB 161)
Total for Year	124.8	124.8	124.8	124.8	124.8
Total for three years after apreading:			374.4		

Calculation Box 2 Nitrogen Needs

For one yr (2018 of corn Silage):	26 ton
Corn Silage needs:	9 lb N per ton (EB 161)
Nitrogen Needs:	234 N availability as affected by application = 50%

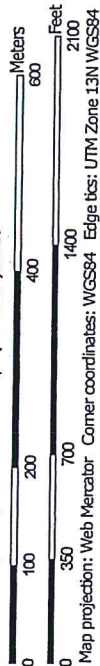
Grassy Hill
Master Creek

Soil Map—Custer County Area, Montana
 (L&M fields 4, 5 and 6)



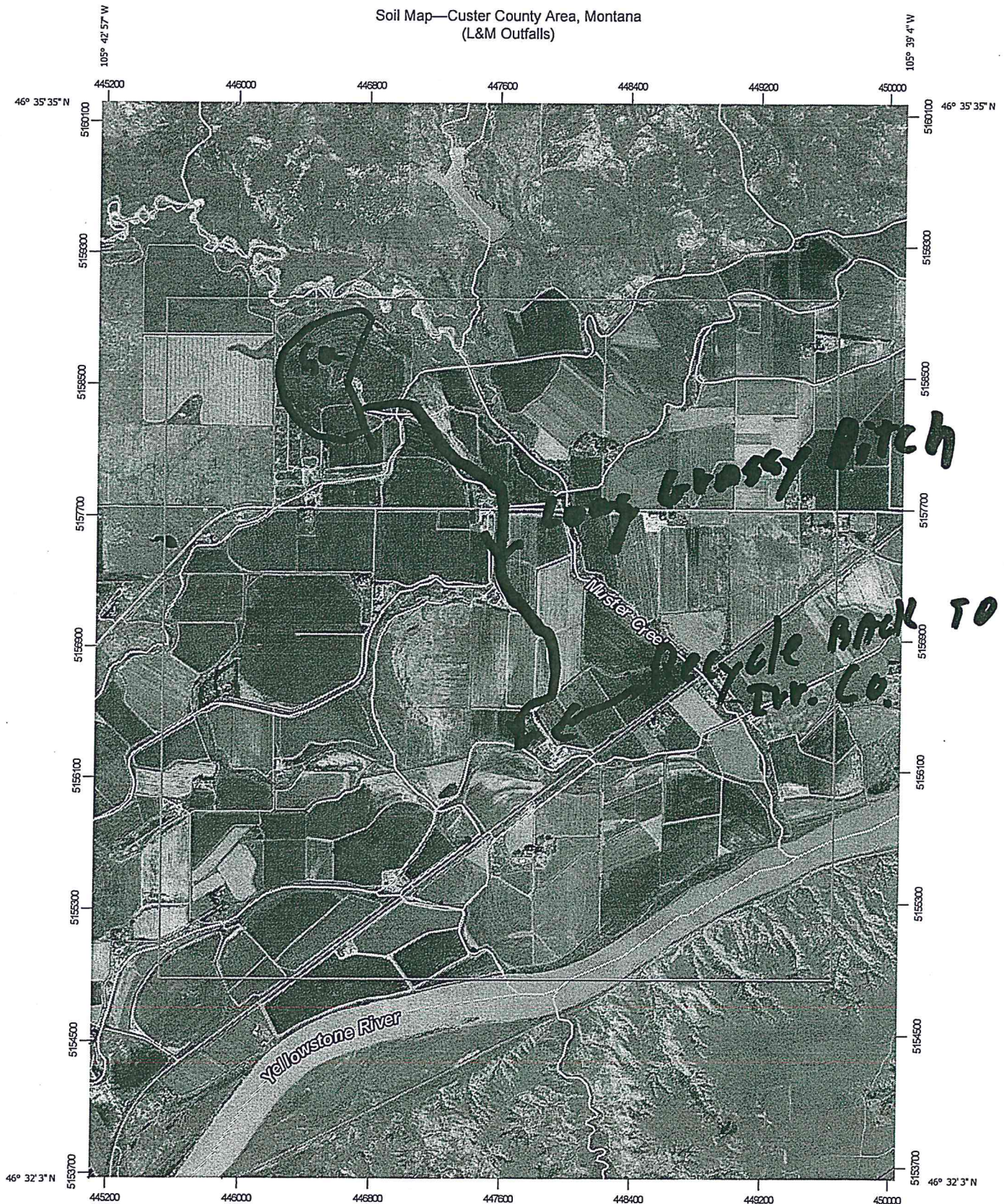
Soil Map may not be valid at this scale.

Map Scale: 1:7,420 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

Soil Map—Custer County Area, Montana
(L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.

0 450 900 1800 2700 Meters

0 1500 3000 6000 9000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84




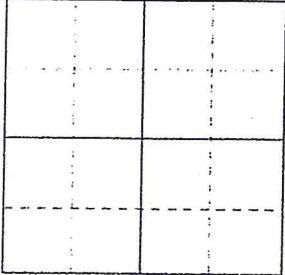
Natural Resources
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Web Soil Survey
National Cooperative Soil Survey

7/2/2017
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Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Soil Erosion	NA	<5 tons/ac/yr	5-10 tons/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils	1	X 1.5	1.5
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils		X 1.5	0
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes	1	X 1.5	1.5
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	4	X 0.5	2
Olson Soil Test P		<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	1	X 0.5	0.5
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges		X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205		X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop.	Surface applied to pasture or >3 months before crop emerges	4	X 1.0	4
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	1	X 1.0	1
Total Phosphorus Index Value:						18.5		

 <p>Soil Analysis by Agvise Laboratories (http://www.agvise.com) Northwood: (701) 587-6010 Benson: (320) 843-4109</p>	SOIL TEST REPORT FIELD ID 5,6 SAMPLE ID FIELD NAME 5,6 COUNTY TWP RANGE SECTION QTR ACRES 0 PREV. CROP Corn-Silage	N  S W E
SUBMITTED FOR: Loran Hinebaugh Miles City, MT Date Sampled	SUBMITTED BY: CE0557 AG PARTNERS-MILES CITY 319 ATLANTIC BOX 1440 MILES CITY, MT 59301 Date Received 06/16/2017	REF # 1917980 BOX # 0 LAB # NW34344 Date Reported 6/21/2017

Nutrient In The Soil		Interpretation				1st Crop Choice			2nd Crop Choice			3rd Crop Choice			
Nitrate	0-12"	86 lb/ac	VLow	Low	Med	High	Corn-Silage								
			*****	*****	*****	*****	YIELD GOAL			YIELD GOAL			YIELD GOAL		
			*****	*****	*****	*****	29 Tons								
			*****	*****	*****	*****	SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
			*****	*****	*****	*****	University								
Olsen Phosphorus	16 ppm	*****	*****	*****	*****	LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		
Potassium	315 ppm	*****	*****	*****	*****	N	215		N			N			
Chloride	0-12"	72 lb/ac	*****	*****	*****	*****	P ₂ O ₅	15	Band (2x2) *	P ₂ O ₅			P ₂ O ₅		
			*****	*****	*****	*****	K ₂ O	10	Band (2x2) *	K ₂ O			K ₂ O		
Sulfur	0-12"	64 lb/ac	*****	*****	*****	*****	Cl	0		Cl			Cl		
			*****	*****	*****	*****	S	0		S			S		
Boron	1.2 ppm	*****	*****	*****	*****	B	0		B			B			
Zinc	1.72 ppm	*****	*****	*****	*****	Zn	0		Zn			Zn			
Iron	18.0 ppm	*****	*****	*****	*****	Fe	0		Fe			Fe			
Manganese	3.4 ppm	*****	*****	*****	*****	Mn	0		Mn			Mn			
Copper	1.16 ppm	*****	*****	*****	*****	Cu	0		Cu			Cu			
Magnesium	666 ppm	*****	*****	*****	*****	Mg	0		Mg			Mg			
Sodium	109 ppm	*****	*****	*****	*****	Lime			Lime			Lime			
Org.Matter	2.9 %	*****	*****	*****	*****	Soil pHBuffer pHCation Exchange Capacity			% Base Saturation (Typical Range)						
Carbonate(CCE)	1.1 %	*****	*****	*****	*****				% Ca	% Mg	% K	% Na	% H		
Sol. Salts	0-12"	0.42 mmho/cm	*****	*****	*****	0-6"	7.9		29.2 meq	(65-75) 76.6	(15-20) 19.0	(1-7) 2.8	(0-5) 1.6	(0-5)	

General Comments: Texture is not estimated on high pH soils.

Crop 1: Soil Nitrogen level is estimated at 86 lbs/acre. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 104 K2O = 241 University guidelines will build P & K soil test levels to the medium range over many years.

Nutrient Budget Worksheet

Field identification: 5b Year: 2017 Spread '18 -'20 Grow Crop: Alfalfa				
Expected Crop Yield: 6 ton/yr				
Phosphorus index results or Phosphorus application from soil test: 20.5 - Index				
Method of Application: Dry Spread				
When will application occur: 10/17				
Nutrient Budget		Nitrogen- based Application	Phosphorus- based Application	Source of Information
1	Crop Nutrient Needs lb/acre	0.0	66.0	EB 161
2	(-) Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-) Residuals from past manure production lb/acre	0.0	0.0	
4	(-) Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-) Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6	= Additional Nutrients Needed, lb/acre	0.0	66.0	
7	Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x) Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9	= Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10	Additional Nutrients needed, lbs/acre (calculated above)	0.0	66.0	
11	(/) Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12	= Manure Application Rate, tons/acre or 1000 gal/acre	0.0	7.9	

Comments:

Spreading based on N does not apply with alfalfa. Rate based on P removal will be used.
A single application of 23.7 t/a will supply three years of P.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 5b	Acres: 40.5
Soil Type(s): 57C Lonna Silt Loam, 2-8% 421A Gerdrum-Creed complex, 0-2%	
Phosphorus Index: 20.5	OK to apply at N needs Olsen: 16

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
Yield t/a	6	6	6	6	6	6

Assessment Narrative

L&M plans to spread manure on field 5a in the fall of 2017 and grow alfalfa through at least 2020. The field will be sprinkler irrigated. Most of Field 5a runoff is directed to a very long (about 1.5 mile) grassy drainage leading to recycle into an irrigation company canal. Part of Field 5a runoff flows over a grassy strip about 100' wide and into Muster Creek. A setback of 100' is used to limit manure entering either drainage. A single application of manure will supply P needs for three years. After the single manure application, no more manure should be applied until at least 9/2020.

Application Instructions

Apply manure at a rate to supply three years of Phosphorus.
 23.7 Ton Manure/acre on 40.5 acres
 For a total of: 959.85 Tons With a dry spreader.
 In the Fall of 2017 This will supply : 199.08 # P2O5/acre

Calculation Box 1 Phosphorus Removal Rates

Year	2018	2019	2020	2021	2022
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
Yeild t/a	6	6	6	6	6
P205 Uptake Rate #/t	11	11	11	11	11 (EB 161)
Total for Year	66	66	66	66	66
Total for three years after apreading:	198				

Calculation Box 2 Nitrogen Needs

N/A

Washed
muskrat creek

Soil Map—Custer County Area, Montana
 (L&M fields 4, 5 and 6)



Map Scale: 1:7,420 if printed on A landscape (11" x 8.5") sheet.

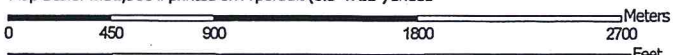
Map projection: Web Mercator Corner coordinates: WGS84 Edge UTM Zone 13N WGS84

Soil Map may not be valid at this scale.

Soil Map—Custer County Area, Montana
(L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84




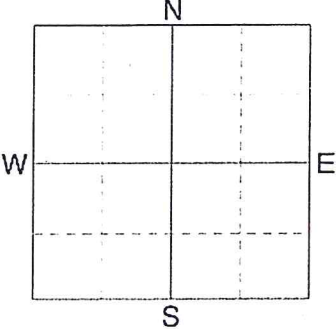
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National Cooperative Soil Survey

7/2/2017
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Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Field: <u>56. 1234</u> Crop: <u>Alfalfa</u> Year: <u>2018</u>								
Soil Erosion	NA	<5 tons/as/yr	5-10 ton/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils	1	X 1.5	1.5
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils		X 1.5	0
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes		X 1.5	0
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	4	X 0.5	2
Olson Soil Test P	-----	<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	1	X 0.5	0.5
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges		X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205		X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop.	Surface applied to pasture or >3 months before crop emerges	8	X 1.0	8
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	1	X 1.0	1
Total Phosphorus Index Value: <u>20.5</u>								

 <p>Soil Analysis by Agvise Laboratories (http://www.agvise.com) Northwood: (701) 587-6010 Benson: (320) 843-4109</p>	SOIL TEST REPORT	
<p>FIELD ID 5,6 SAMPLE ID FIELD NAME 5,6 COUNTY TWP RANGE SECTION QTR ACRES 0 PREV. CROP Corn-Silage</p>		
<p>SUBMITTED FOR: Loran Hinebaugh</p> <p>Miles City, MT</p> <p>Date Sampled</p>	<p>SUBMITTED BY: CE0557 AG PARTNERS-MILES CITY 319 ATLANTIC BOX 1440 MILES CITY, MT 59301</p>	<p>REF # 1917980 BOX # 0 LAB # NW34344</p>
Date Received 06/16/2017		Date Reported 6/21/2017

Nutrient In The Soil		Interpretation				1st Crop Choice			2nd Crop Choice			3rd Crop Choice			
Nitrate	0-12"	86 lb/ac	VLow	Low	Med	High	Corn-Silage								
			*****	*****	*****	*****	YIELD GOAL			YIELD GOAL			YIELD GOAL		
							29 Tons								
							SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
							University								
			LB/ACRE		APPLICATION		LB/ACRE		APPLICATION		LB/ACRE		APPLICATION		
	Olsen	16 ppm	*****	*****	*****	*****	N	215		N			N		
	Phosphorus		*****	*****	*****	*****	P ₂ O ₅	15	Band (2x2) *	P ₂ O ₅			P ₂ O ₅		
			*****	*****	*****	*****	K ₂ O	10	Band (2x2) *	K ₂ O			K ₂ O		
	0-12"	72 lb/ac	*****	*****	*****	*****	Cl	0		Cl			Cl		
	Chloride		*****	*****	*****	*****	S	0		S			S		
	0-12"	64 lb/ac	*****	*****	*****	*****	B	0		B			B		
	Sulfur		*****	*****	*****	*****	Zn	0		Zn			Zn		
	Boron	1.2 ppm	*****	*****	*****	*****	Fe	0		Fe			Fe		
	Zinc	1.72 ppm	*****	*****	*****	*****	Mn	0		Mn			Mn		
	Iron	18.0 ppm	*****	*****	*****	*****	Cu	0		Cu			Cu		
	Manganese	3.4 ppm	*****	*****	*****	*****	Mg	0		Mg			Mg		
	Copper	1.16 ppm	*****	*****	*****	*****	Lime			Lime			Lime		
	Magnesium	666 ppm	*****	*****	*****	*****									
	Calcium	4464 ppm	*****	*****	*****	*****	Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)					
	Sodium	109 ppm	*****	*****	*****	*****				% Ca	% Mg	% K	% Na	% H	
	Org.Matter	2.9 %	*****	*****	*****	*****	0-6"	7.9	29.2 meq	(65-75) 76.6	(15-20) 19.0	(1-7) 2.8	(0-5) 1.6	(0-5)	
	Carbonate(CCE)	1.1 %	*****	*****	*****	*****									
	0-12"	0.42 mmho/cm	*****	*****	*****	*****									
	Sol. Salts														

General Comments: Texture is not estimated on high pH soils.

Crop 1: Soil Nitrogen level is estimated at 86 lbs/acre. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 104 K2O = 241 University guidelines will build P & K soil test levels to the medium range over many years.

Nutrient Budget Worksheet

Field identification: 10 and 11 Year: 2018 Spread '19, '20, '21 Grow Crop: Alfalfa

Expected Crop Yield: 6 ton/yr

Phosphorus index results or Phosphorus application from soil test: 24 - Index

Method of Application: Dry Spread

When will application occur: 10/18

Nutrient Budget			Nitrogen- based Application	Phosphorus- based Application	Source of Information
1		Crop Nutrient Needs lb/acre	0.0	66.0	EB 161
2	(-)	Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-)	Residuals from past manure production lb/acre	0.0	0.0	
4	(-)	Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-)	Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6		= Additional Nutrients Needed, lb/acre	0.0	66.0	
7		Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x)	Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9		= Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10		Additional Nutrients needed, lbs/acre (calculated above)	0.0	66.0	
11	(/)	Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12		= Manure Application Rate, tons/acre or 1000 gal/acre	0.0	7.9	

Comments: Spreading based on N does not apply with alfalfa. Rate based on P removal will be used.
A single application of 23.7 t/a will supply three years of P.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 10 & 11 Acres: 19.8
Soil Type(s): 421A Gerdrum-Creed complex, 0-2%

Phosphorus Index: 24 Phosphorus removal rates only Olsen: 15

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
Yield t/a	6	6	6	6	6	6

Assessment Narrative

L&M plans to spread manure on fields 10 and 11 in the fall of 2018 and grow alfalfa through at least 2021. The field is flood irrigated with boarder dikes. Runoff from both field 10 and 11 is directed to a short grassy ditch and then recycles into an irrigation company canal. A setback of 100' is used to limit manure entering either drainage. The single application of manure in 2018 will supply phosphorus equal to crop removal for three years. After the single manure application, no more manure should be applied until at least 9/2021

Application Instructions

Apply manure at a rate to supply three years of Phosphorus.

23.7 Ton Manure/acre on 19.8 acres

For a total of : 469.26 Tons With a dry spreader.

In the Fall of 2018 This will supply : 199.08 # P2O5/acre

Calculation Box 1 Phosphorus Removal Rates

Year	2019	2020	2021	2022	2023
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
Yeild t/a	6	6	6	6	6
P205 Uptake Rate #/t	11	11	11	11	11 (EB 161)
Total for Year	66	66	66	66	66
Total for three years after apreading:	198				

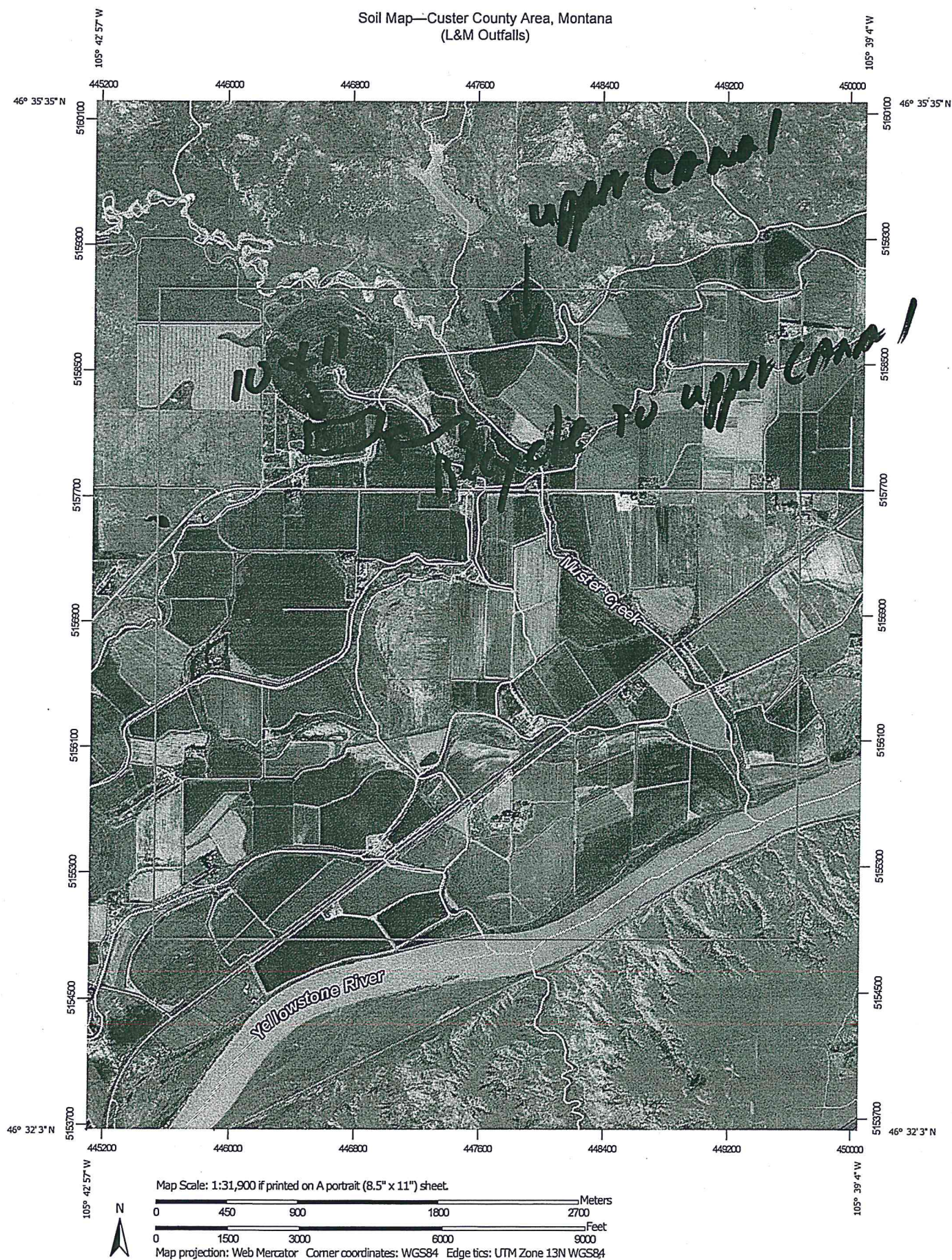
Calculation Box 2 Nitrogen Needs

N/A

Soil Map—Custer County Area, Montana



Soil Map—Custer County Area, Montana
(L&M Outfalls)




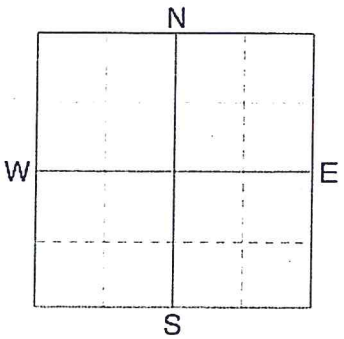
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National Cooperative Soil Survey

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Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field: <u>10811</u> Crop: <u>Alfalfa</u> Year: <u>2019</u>								
Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Soil Erosion	NA	<5 tons/ac/yr	5-10 ton/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils	1	X 1.5	1.5
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils		X 1.5	0
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes		X 1.5	0
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	4	X 0.5	2
Olson Soil Test P	-----	<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	1	X 0.5	0.5
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges		X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205		X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop.	Surface applied to pasture or >3 months before crop emerges	8	X 1.0	8
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	4	X 1.0	4
Total Phosphorus Index Value: <u>24</u>								

 <p>Soil Analysis by Agvise Laboratories (http://www.agvise.com) Northwood: (701) 587-6010 Benson: (320) 843-4109</p>	SOIL TEST REPORT	
FIELD ID 10,11 SAMPLE ID FIELD NAME 10,11 COUNTY TWP RANGE SECTION QTR ACRES 0 PREV. CROP Alfalfa		
SUBMITTED FOR: Loran Hinebaugh Miles City, MT	SUBMITTED BY: CE0557 AG PARTNERS-MILES CITY 319 ATLANTIC BOX 1440 MILES CITY, MT 59301	REF # 1917978 BOX # 0 LAB # NW34381
Date Sampled	Date Received 06/19/2017	Date Reported 6/21/2017

Nutrient In The Soil		Interpretation				1st Crop Choice			2nd Crop Choice			3rd Crop Choice			
Nitrate	0-6"	62 lb/ac	VLow	Low	Med	High	Alfalfa								
			*****	*****	*****	*****	YIELD GOAL			YIELD GOAL			YIELD GOAL		
							6 Tons								
							SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
							University								
			LB/ACRE		APPLICATION		LB/ACRE		APPLICATION		LB/ACRE		APPLICATION		
Olsen		15 ppm	*****	*****	*****	*****	N	0		N			N		
Phosphorus							P ₂ O ₅	0		P ₂ O ₅			P ₂ O ₅		
Potassium		312 ppm	*****	*****	*****	*****	K ₂ O	0		K ₂ O			K ₂ O		
Chloride	0-6"	36 lb/ac	*****	*****	*****		Cl	0		Cl			Cl		
							S	0		S			S		
							B	0		B			B		
							Zn		Not Available	Zn			Zn		
							Fe	0		Fe			Fe		
Sulfur						Mn	0		Mn			Mn			
Boron		1.2 ppm	*****	*****	*****		Cu	0		Cu			Cu		
Zinc		1.74 ppm	*****	*****	*****	*****	Mg	0		Mg			Mg		
Iron		17.0 ppm	*****	*****	*****	*****	Lime			Lime			Lime		
Manganese		3.0 ppm	*****	*****	*****										
Copper		1.1 ppm	*****	*****	*****										
Magnesium		661 ppm	*****	*****	*****	*****									
Calcium		4471 ppm	*****	*****	*****	*****									
Sodium		110 ppm	*****	*****	*****										
Org.Matter		3.0 %	*****	*****	*****										
Carbonate(CCE)		1.0 %	*****	*****	*****										
Sol. Salts	0-6"	0.57 mmho/cm	*****	*****	*****		Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)					
							0-6" 7.9		29.1 meq	% Ca	% Mg	% K	% Na	% H	
										(65-75) 76.7	(15-20) 18.9	(1-7) 2.7	(0-5) 1.6	(0-5)	

General Comments: Texture is not estimated on high pH soils.

Crop 1: Soil Nitrogen level is estimated at 62 lbs/acre. Nitrogen is credited 50 lbs for the previous crop on University Guidelines. Nitrogen credits may need to be adjusted based on local conditions. Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 60 K2O = 300 University guidelines will build P & K soil test levels to the medium range over many years.

Nutrient Budget Worksheet

Field identification: 13 & 14 Year: 2018 Spread '19, '20, &'21 Grow Crop: Alfalfa				
Expected Crop YIELD: 4 ton/yr				
Phosphorus index results or Phosphorus application from soil test: 21 - Index				
Method of Application: Dry Spread				
When will application occur: 10/18				
Nutrient Budget		Nitrogen- based Application	Phosphorus- based Application	Source of Information
1	Crop Nutrient Needs lb/acre	0.0	44.0	EB 161
2	(-) Credits from previous legume crops, lb/ac	0.0	0.0	
3	(-) Residuals from past manure production lb/acre	0.0	0.0	
4	(-) Nutrients supplied by commercial fertilizer and Biosolids, lb/acre	0.0	0.0	
5	(-) Nutrients supplied in irrigation water lb/acre	0.0	0.0	
6	= Additional Nutrients Needed, lb/acre	0.0	44.0	
7	Total Nitrogen and Phosphorus in manure, lbs/ton or lbs/1000 gal (from manure test)	17.9	8.4	Manure Test 6/7/2016
8	(x) Nutrient Availability factor, for Phosphorus based application use 1.0	0.50	1.0	
9	=Available Nutrients in Manure, lbs/ton or lb/1000 gal	9.0	8.4	
10	Additional Nutrients needed, lbs/acre (calculated above)	0.0	44.0	
11	(/) Available Nutrients in Manure, lb/ton or lbs/1000 gal (calculated above)	9.0	8.4	
12	=Manure Application Rate, tons/acre or 1000 gal/acre	0.0	5.2	

Comments: Spreading based on N does not apply with alfalfa. Rate based on P removal will be used.
A single application of 15.6 t/a will supply three years of P.

L&M Feedlot NMP Field Analysis

For the Period: 2017-2020

Field Information

Field ID: 13 & 14	Acres: 33.4
Soil Type(s): 489A Spinekop Silty Clay Loam, 0-2% Slopes	
Phosphorus Index: 21	Phosphorus removal rates only Olsen: 8

Field Crop History, Plan and Yield Estimates

Year	2017	2018	2019	2020	2021	2022
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
Yield t/a	4	4	4	4	4	4

Assessment Narrative

L&M plans to spread manure on fields 13 and 14 in the fall of 2018 and grow alfalfa through at least 2021. The field is flood irrigated with boarder dikes. Runoff from field 13 is directed to a long grassy ditch and then recycles into an irrigation company canal. Field 14 runoff flows through a short grassy ditch and into Muster creek. A setback of 100' is used to limit manure entering either drainage. The single application of manure in 2018 will supply phosphorus equal to crop removal for three years. After the single manure application, no more manure should be applied until at least 9/2021.

Application Instructions

Apply manure at a rate to supply three years of Phosphorus.
 15.6 Ton Manure/acre on 33.4 acres
 For a total of: 521.04 Tons With a dry spreader.
 In the Fall of 2018 This will supply: 131.04 # P2O5/acre

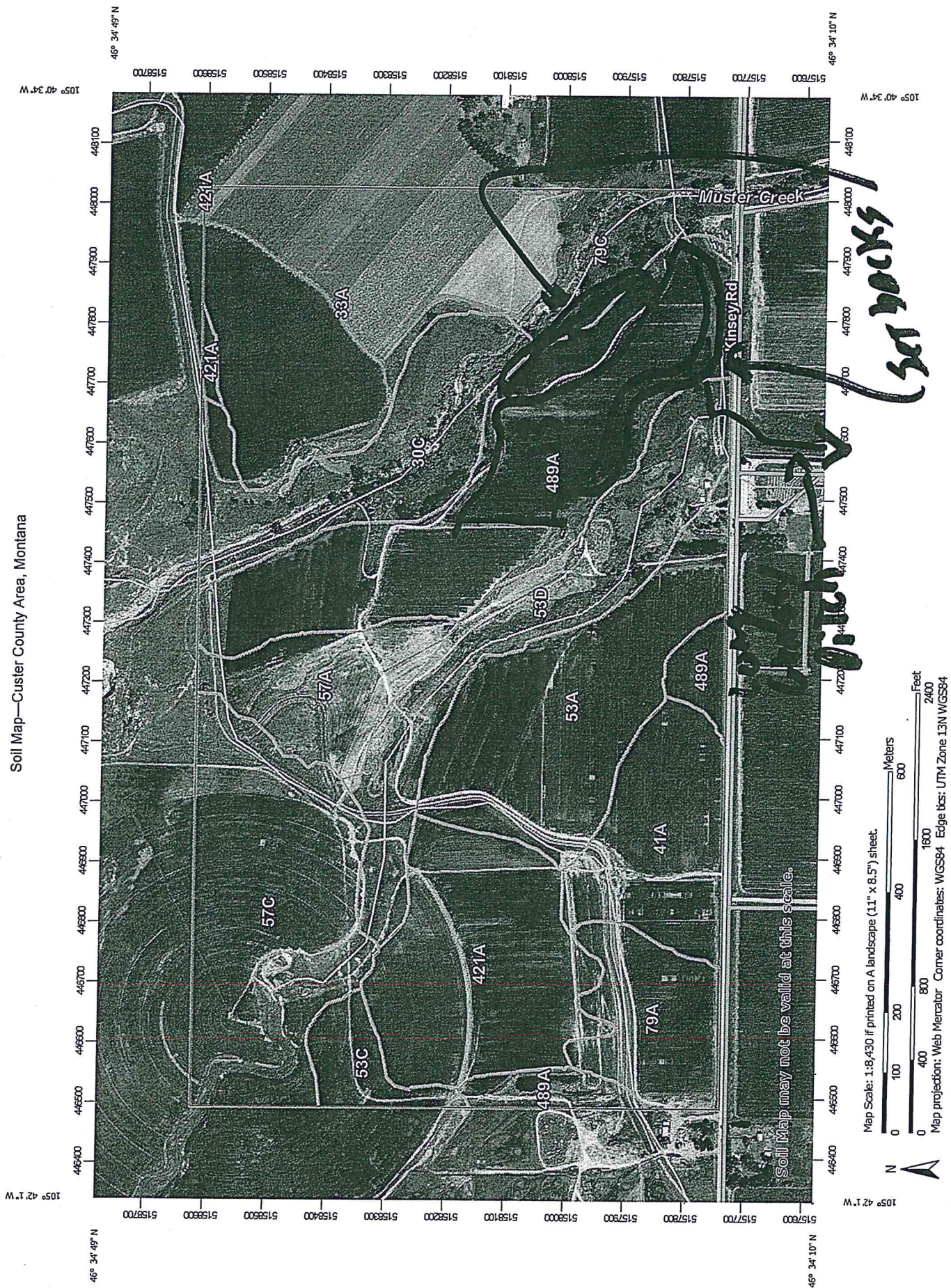
Calculation Box 1 Phosphorus Removal Rates

Year	2019	2020	2021	2022	2023
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
Yeild t/a	4	4	4	4	4
P205 Uptake Rate #/t	11	11	11	11	11 (EB 161)
Total for Year	44	44	44	44	44
Total for three years after apreading:			132		

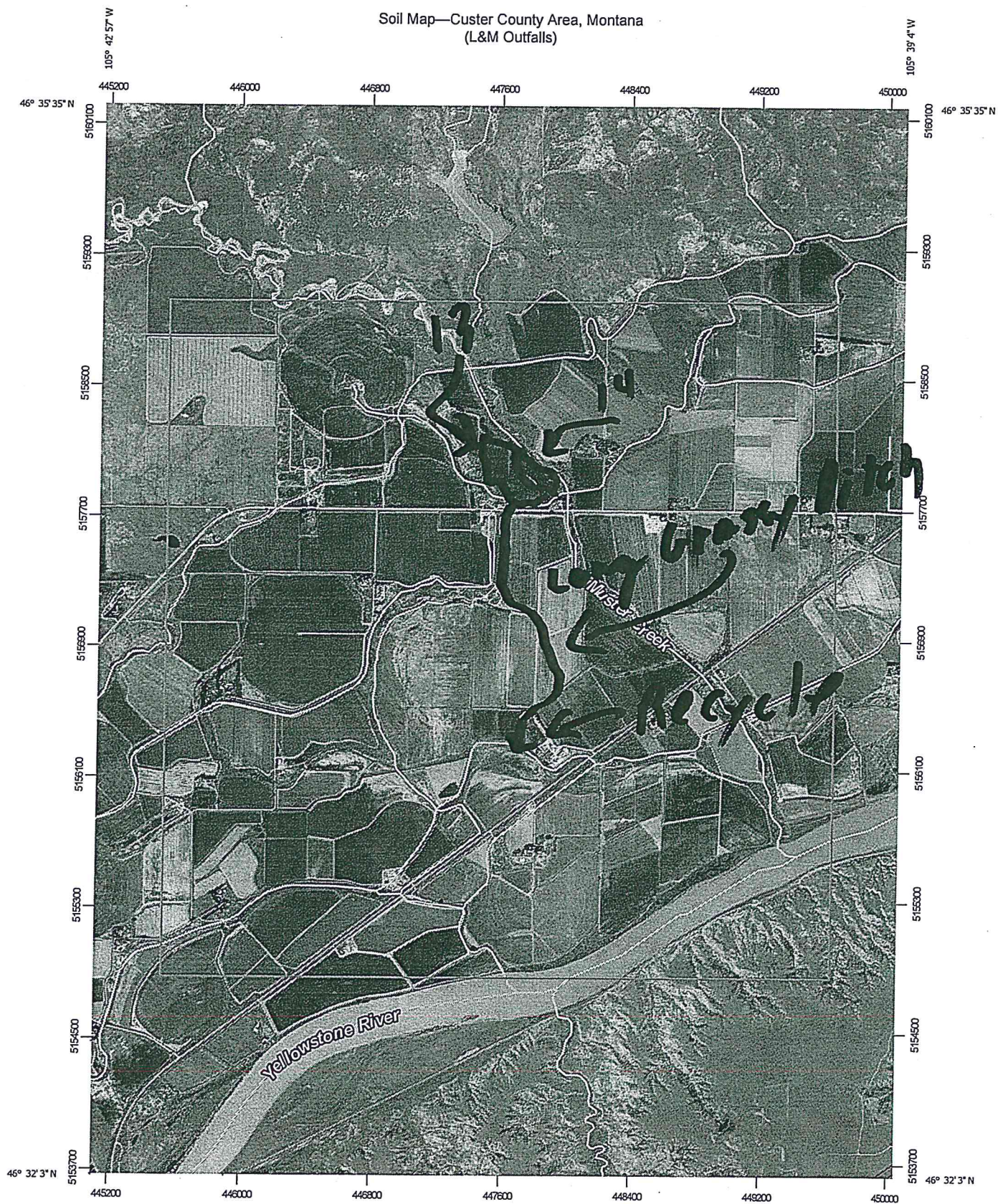
Calculation Box 2 Nitrogen Needs

N/A

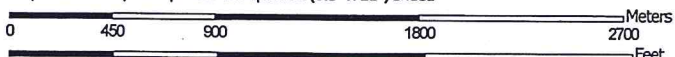
Soil Map—Custer County Area, Montana



Soil Map—Custer County Area, Montana
(L&M Outfalls)



Map Scale: 1:31,900 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



Natural Resources
Conservation Service


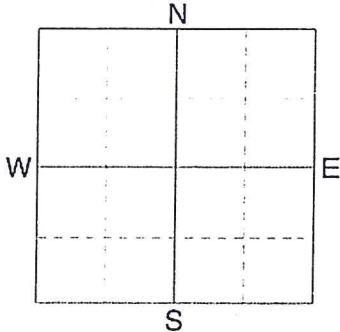
Web Soil Survey
National Cooperative Soil Survey

7/2/2017
Page 1 of 4

Appendix A: Phosphorus Index Worksheet (Complete for each field and crop)

Field: 13414 Crop: Alfalfa Year: 2018

Field Category Factor	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Risk Value (0,1,2,4,8)	Weight Factor	Weight Risk
Soil Erosion	NA	<5 tons/as/yr	5-10 ton/ac/yr	10-15 tons/ac/yr	QA> 10 for erodible soils		X 1.5	0
Furrow Irrigation Erosion	N/A	Tail water recovery, QS>6 very erodible soils, or QS>10 other soils	QS> for erosion resistant soil	QS> for erodible soils	QA>6 for very erodible soils		X 1.5	0
Sprinkler Irrigation Erosion	All fields 0-3% slope, all sandy fields or field evaluation indicates little or no runoff large spray on silts 3-8%	Medium spray on silty soils 3-15% slopes, large spray on silty soils 8-15% slope, low spray on silt soils 3-8% large spray on clay soil 3-15% slope	Medium spray on clay soils 3-8% slopes, large spray on clay soils >15% slope, medium spray on silt soil >15% slope	Medium spray on clay soils >8% slope, low spray on clay soil 3-8% slope, low spray on silty soils >15% slopes	Low spray on clay soils >8% slopes		X 1.5	0
Runoff Class	Negligible	Very Low or Low	Medium	High	Very High	1	X 0.5	0.5
Olson Soil Test P	—	<20 ppm	20-40 ppm	40-80 ppm	>80 ppm	1	X 0.5	0.5
Commercial P Fertilizer Application Method	None Applied	Placed with Planter or injection deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop emerges	Surface applied to pasture or >3 months before crop emerges		X 1.0	0
Commercial P Fertilizer Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205		X 1.0	0
Organic P Source Application Method	None Applied	Injected deeper than 2 inches	Incorporated <3 months prior to planting or surface applied during growing season	Incorporated >3 months before crop or surface applied <3 months before crop.	Surface applied to pasture or >3 months before crop emerges	8	X 1.0	8
Organic P Source Application Rate	None Applied	<30 lbs/ac P205	31-90 lbs/ac P205	91-150 lbs/ac P205	>150 lbs/ac P205	8	X 1.0	8
Distance to Concentrated Surface Water Flow	>1,000 feet	200-1,000 feet, or functioning grass waterways in concentrated surface water	100-200 feet	<100 feet	0 feet or application are directly into concentrated surface water flow areas.	4	X 1.0	4
Total Phosphorus Index Value: <u>21</u>								

 <p>Soil Analysis by Agvise Laboratories (http://www.agvise.com) Northwood: (701) 587-6010 Benson: (320) 843-4109</p>	SOIL TEST REPORT	
SUBMITTED FOR: Loran Hinebaugh Miles City, MT Date Sampled	FIELD ID 13,14 SAMPLE ID FIELD NAME 13,14 COUNTY TWP RANGE SECTION QTR ACRES 0 PREV. CROP Alfalfa SUBMITTED BY: CE0557 AG PARTNERS-MILES CITY 319 ATLANTIC BOX 1440 MILES CITY, MT 59301	REF # 1917979 BOX # 0 LAB # NW34345 Date Received 06/16/2017 Date Reported 6/21/2017

Nutrient In The Soil		Interpretation				1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
		VLow	Low	Med	High	Alfalfa					
Nitrate	0-6" 66 lb/ac	*****	*****	*****	*****	YIELD GOAL		YIELD GOAL		YIELD GOAL	
						6 Tons					
						SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
						University					
						LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Olsen Phosphorus	8 ppm	*****	*****			N	0	N		N	
Potassium	348 ppm	*****	*****	*****	*****	P ₂ O ₅	55 Broadcast	P ₂ O ₅		P ₂ O ₅	
Chloride	0-6" 26 lb/ac	*****	*****			K ₂ O	0	K ₂ O		K ₂ O	
						Cl	0	Cl		Cl	
	0-6" 26 lb/ac	*****	*****			S	25 Broadcast	S		S	
Sulfur						B	0	B		B	
Boron	1.4 ppm	*****	*****	*****	*****	Zn	Not Available	Zn		Zn	
Zinc	1.40 ppm	*****	*****	*****	*****	Fe	0	Fe		Fe	
Iron	13.3 ppm	*****	*****	*****	*****	Mn	0	Mn		Mn	
Manganese	2.6 ppm	*****	*****	*****	*****	Cu	0	Cu		Cu	
Copper	1.3 ppm	*****	*****	*****	*****	Mg	0	Mg		Mg	
Magnesium	676 ppm	*****	*****	*****	*****	Lime		Lime		Lime	
Calcium	5354 ppm	*****	*****	*****	*****	Soil pH		Cation Exchange Capacity		% Base Saturation (Typical Range)	
Sodium	143 ppm	*****	*****	*****	*****					% Ca	% Mg
Org. Matter	3.6 %	*****	*****	*****	*****	Buffer pH				% K	% Na
Carbonate(CCE)	2.5 %	*****	*****	*****	*****						% H
	0-6" 0.56 mmho/cm	*****	*****	*****	*****	0-6" 8.1		33.9 meq		(65-75) 78.9	(15-20) 16.6
Sol. Salts										(1-7) 2.6	(0-5) 1.8

General Comments: Texture is not estimated on high pH soils.

Crop 1: Soil Nitrogen level is estimated at 66 lbs/acre. Nitrogen is credited 50 lbs for the previous crop on University Guidelines. Nitrogen credits may need to be adjusted based on local conditions. Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 60 K2O = 300 University guidelines will build P & K soil test levels to the medium range over many years.

Section F - CERTIFICATION

Permittee Information: This form must be completed, signed, and certified as follows:

- For a corporation, by a principal officer of at least the level of vice president;
- For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
- For a municipality, state, federal, or other public facility, by either a principal executive officer or ranking elected official.

All Permittees Must Complete the Following Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information; including the possibility of fine and imprisonment for knowing violations. [75-5-633, MCA]

A. Name (Type or Print)

Loren Winkler

B. Title (Type or Print)

C. Phone No.

D. Signature



E. Date Signed

7/7/17

The Department will not process this form until all of the requested information is supplied, and the appropriate fees are paid. Return this form and the applicable fee to:

Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, MT 59620-0901
(406) 444-3080

RECEIVED

JUL 10 2017

DEQ WATER QUALITY DIVISION

L&M Feedlot Operations Plan

Daily

- Record Census
- Inspect Water Tanks and Correct Overflows – Record Tank Status on Feeding Record Sheets
- Inspect Berms and Ditches in Feedlot Area
- Remove Dead

Monthly

- Summarize Census Totals
- Bury Dead

Yearly

- Apply Manure According to NMP and a Manure Application Plan
- Record Applications on L&M Manure Application Records
- Sample Manure according to Sampling Plan
- Sample Soils every three years according to Sampling Plan
- Revise NMP if Necessary
- Calculate total CDs for the previous yr (one cow for one day equals one CD)
- Submit annual reports AR2 and DMR by Jan 28
- Copies of Annual Reports and Originals of Manure Application Records, Manure Test Results and Soil Test results must be retained for at least 5 yrs.

Precipitation Events

- After rainfall or melting, inspect facility
- If after an extraordinary rainfall event, berms are overflowed or VTAs are overwhelmed, record the dates and durations of the overflows. Estimate the duration of the event and at about half way through, sample the overflow stream(s). Collect 1 pt sample(s) in a clean container and store in a freezer. Contact DEQ for further instructions.

L&M Feedlot Manure Application Plan

Applicator: _____

Date: _____

Fields and Target Rates:

<u>Field</u>	<u>Acres</u>	<u>Target Rate</u>	<u>Notes</u>
--------------	--------------	------------------------	--------------

Instructions:

- Use at least one Manure Application Record for each field
- Halfway through the first field, use the weights and Estimate the actual application rate. Adjust application rate if necessary.
- Setbacks are required on all fields. Manure **must not** be spread within 100' of any location where drain or storm water will leave any field. If unsure of drainage directions, ask a supervisor.
- Weigh every 10th load and record.
- Immediately after completing a field and before starting the next field, complete the record sheet and calculate the actual application rate. Make adjustments as necessary.
- Limit piles of manure in the fields.

L&M Feedlot Manure Application Plan

Applicator: _____

Date: 2018

Fields and Target Rates:

<u>Field</u>	<u>Acres</u>	<u>Target Rate</u>	<u>Notes</u>
10411	19.8	16.5	
13414	33.4	11	

Instructions:

- Use at least one Manure Application Record for each field
- Halfway through the first field, use the weights and Estimate the actual application rate. Adjust application rate if necessary.
- Setbacks are required on all fields. Manure **must not** be spread within 100' of any location where drain or storm water will leave any field. If unsure of drainage directions, ask a supervisor.
- Weigh every 10th load and record.
- Immediately after completing a field and before starting the next field, complete the record sheet and calculate the actual application rate. Make adjustments as necessary.
- Limit piles of manure in the fields.

L&M Feedlot Manure Application Plan

Applicator: _____

Date: 2018

Fields and Target Rates:

<u>Field</u>	<u>Acres</u>	<u>Target Rate</u>	<u>Notes</u>
15	12.4	30	IPA
16	42	30	"
17+18	39	30	"
19+20	98.9	30	"
5a	72	30	"
5b	40.5	16.5	"

Instructions:

- Use at least one Manure Application Record for each field
- Halfway through the first field, use the weights and Estimate the actual application rate. Adjust application rate if necessary.
- Setbacks are required on all fields. Manure **must not** be spread within 100' of any location where drain or storm water will leave any field. If unsure of drainage directions, ask a supervisor.
- Weigh every 10th load and record.
- Immediately after completing a field and before starting the next field, complete the record sheet and calculate the actual application rate. Make adjustments as necessary.
- Limit piles of manure in the fields.

L&M Feedlot Manure Application Record

At least one record sheet must be completed for each field.

Field: _____ Date(s): _____ Applicator: _____
Acres: _____ Target Rate: _____

Load Tally

[illegible]

Test Weights

Loaded	Empty	Net

Loaded	Empty	Net

Attach Weigh Tickets

Actual Rate

Total Loads	Avg Net Wt	Total Tons	Tons/Acre

Notes: Obtain target rates from the current NMP or Application Plan
Do not spread manure within 100' of the lower ends of fields

L&M Feedlot Sampling Plan

Manure

L&M must sample its manure at least once per year.

Target date to sample is June 1.

The method of sampling must be in accordance with Montana Law ARM 17.30.1334

From ARM 17.30.1334

Manure that is land applied must be sampled at least once per year and analyzed for total nitrogen (as N), ammonium nitrogen (as $\text{NH}_4\text{-N}$), total phosphorus (as P_2O_5), total potassium (as K_2O), and percent dry matter solids). Except for percent dry matter, the results of this analysis must be expressed as pounds per 1,000 gals for liquid wastes and pounds per ton for solid manure. The sample must be representative of the manure that is to be applied to a field and must be collected and analyzed in accordance with (a) and (b).

(a) Solid manure must be sampled from at least ten different locations (subsamples) within the material to be applied from a depth of at least 18 inches below the surface. Subsamples must be thoroughly mixed in a clean receptacle and a sample of the mixed material must be collected and placed in a sealable plastic bag or other sample container approved by the analytical laboratory. The sample must be identified with the name, source, and date. The sample must be cooled to four degrees centigrade and analyzed within seven days or frozen at minus 18 degrees centigrade for up to six months or as directed by the analytical laboratory specified in (6).

L&M Feedlot Sampling Plan -Continued

Soil

L&M must sample each field at least once every three years.

Target date to sample is April 15

The method of sampling must be in accordance with Montana Law ARM 17.30.1334

From ARM 17.30.1334

(a) A minimum of ten individual core samples must be composited to formulate a composite sample for the field. Core sampling in fields with significant landscape variation, including soil type, slope, degree of erosion, drainage, historic usage, or other factors, must be collected from each unit in proportion to the relative abundance in terms of total area. Uniform fields may be sampled in a simple random, stratified random, or systematic pattern following the guidance sources listed below. Individual core samples must be composited and thoroughly mixed in a clean plastic container except that core samples collected at different depths must be kept separate. Alternative soil sampling procedures are given in the following:

(i) United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), Sampling Soils for Nutrient Management – Manure Resource Series, MT, April 2007; and

(ii) Montana State University Extension, MontGuide, Interpretation of Soil Test Reports for Agriculture, MT200702AG, July 2007.

(b) The composite soil sample for phosphorus analysis must be collected from a depth of zero to six inches below the surface and analyzed for phosphorus using the Olsen soil test method. Results must be reported as mg/kg phosphorus and pounds per acre.

(c) Composite soil samples for nitrogen analysis must be collected from a depth of zero to six inches below the surface and analyzed for total nitrogen (as N) and nitrate (as N). A second composite sample must be collected at a depth of six to 24 inches and analyzed for nitrate (as N) only. Samples must be analyzed in accordance with method code 4H2a1-3 in United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42, Version 4.0, November 2004. Results must be reported as mg/kg total nitrogen and pounds per acre.

(6) Analytical laboratories approved for manure and soil testing are given in Montana State University Extension Service Publication 4449-1, Soil Sampling and Laboratory Selection, June 2005.

9/5/17
ATVIAL

Calculation sheet for P_2O_5 Removal By Corn Silage

1 TON of Silage @ 67% H_2O And
30% grain

~~0.6~~

Correct BACK TO 15%

$$0.3 \text{ TON grain @ } 67\% H_2O \left(\frac{.33}{.85} \right) \left(\frac{2000\#}{\text{TON}} \right) \left(\frac{Bu}{56\#} \right) = 4$$

$$4.16 \text{ Bu Corn} \times 0.6 \text{ \# } P_2O_5 / \text{Bu} = 2.5\#$$

↑
EP 161 Table 21

$$0.7 \text{ TON STRAW @ } 67\% \left(\frac{.33}{.85} \right) = 0.27 \text{ TON STRAW @}$$

$$0.27 \text{ TON} \times 8.8 \text{ \# } P_2O_5 / \text{TON} = 2.38 \text{ \# } P_2O_5$$

$$2.5 + 2.38 = 4.88 \text{ \# } P_2O_5 / \text{TON Silage}$$



LABORATORY ANALYTICAL REPORT

Client: Harland Colony
Lab ID: B16060713-002
Client Sample ID: Harland Colony CNMP

Report Date: 06/21/16
Collection Date: 06/07/16
Date Received: 06/08/16

Manure Testing - CNMP Manure Package

<u>Analyte</u>	<u>Dry Basis</u> <u>mg/kg</u>	<u>As Received Moisture Basis</u>		
		<u>Percent</u>	<u>mg/kg</u>	<u>pounds/ton</u>
Moisture	0.0	55.2		
Solids	100.0	44.8		
Total Kjeldahl Nitrogen	19,700	0.88	8,826	17.7
Nitrate as N	233	0.01	104	0.2
Nitrogen, Total as N	19,933	0.89	8,930	17.9
Phosphorus, Total as P	4,100	0.18	1,837	3.7
Phosphorus, as P₂O₅	9,389	0.42	4,206	8.4
Potassium, Total as K	20,900	0.94	9,363	18.7
Potassium, as K₂O	25,080	1.12	11,236	22.5

NOTES:

To adjust to a different moisture, divide the current value by the percent dry matter (expressed as a decimal), then multiply by the desired percent dry matter (also expressed in a decimal). For example, total nitrogen was 80 pounds per ton at 50% moisture and the usual spreading moisture is 45%, 80 divided by 0.50 = 160 pounds of total nitrogen per dry ton of manure. Then multiply 160 x 0.55 (% DM) = 88 total pounds of nitrogen per ton at 45% moisture.

For liquid or semi-liquid manure slurry you can calculate pounds per 1000 gallons by multiplying the pounds/ton concentration by 4.

mg/kg = ppm